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Evaluation of Public and Private Financial Incentives for Retirement

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Executive Summary

1. Background

In late 1997, Human Resources Development Canada (HRDC) initiated an *evaluation to examine the potential impact of public and private incentives for retirement, associated issues and related program implications*. The evaluation was carried out by SPR Associates of Toronto, and the evaluation team was led by Morley Gunderson and Doug Hyatt of the Centre for Industrial Relations, University of Toronto. This study is one of an ongoing series of studies of retirement and work. Its generality is limited by the fact that its analysis is based on particular cases, which are not necessarily typical.

2. The Evaluation Issues/Questions

The central issues of the evaluation are:

- the potential impact of financial incentives or disincentives to retire arising from public and private retirement benefits under a restricted set of conditions;
- the importance of various factors affecting the retirement decision; and
- the importance of different income sources to the income position of older age groups before and after retirement.

Other issues and questions included:

- cross-subsidies within the retirement income system between generations, income groups and genders;
- the actuarial neutrality of the public and private pension plans;
- consistency of the public private pension system with the traditional retirement age of 65;
- trends in RPP design;
- any consequences for the EI program; and
- future directions for research on retirement incentives.

The public retirement system is seen as including the universal Old Age Security (OAS) benefit, its associated income-tested Guaranteed income Supplement (GIS) and Spouses Allowance (SPA), and the Canada/Quebec Pension Plan (CPP/QPP). The pension vehicles are seen as including Registered Pension Plans (RPPs), and Registered Retirement Saving Plans (RRSPs).

3. The Evaluation Process

The evaluation was carried out in two stages and through the application of different methodologies.

- Phase I, produced a planning report which comprised:
  - — an extensive literature review;
  - — a review of alternative data sets and modelling approaches
- Phase II, carried our three key studies:
  - — estimation of the potential financial incentive effects of private and public pensions under certain assumptions;
  - — an empirical analysis of important factors influencing the retirement decisions; and
  - — an analysis of other issues related to the retirement planning decision and the integrity of the public and private retirement pension system.

While existing data sources and necessarily simplifying assumptions place restrictions on the types of conclusions which could be obtained in this evaluation, the results presented in this summary report provide useful information on these issues. The results also provide a useful basis for drawing some strategic conclusions about how HRDC might proceed with further evaluation research and policy analysis of key issues raised by the aging of the population.

4. The Background Research

The research began with an examination of background data and modelling alternatives for the study of public-private pension retirement incentives, and an extensive review of the literature.[1] The review of data sources considered a wide range of information sources, primarily Statistics Canada and HRDC data.

It was concluded that existing data bases have a number of weaknesses in part because all of the determinants of retirement are not available in a single data set. Also, it would be very difficult to incorporate the features of public pension plans and especially private employer pension plans into data sets that include non-pension determinants of retirement. The weakness is particularly pronounced with respect to private employer plans, because these plans have a wide range of features that are designed specifically to influence retirement decisions.

The Statistics Canada, 1995 General Social Survey (GSS), Cycle 9 was selected as the main source for the statistical analyses because, among other things, it examined Canada's changing retirement patterns. The Survey of Consumer Finances was selected for more descriptive data on the characteristics of the retiring population. These sources were deemed to be the best data bases available for these purposes.

Also, models were developed to estimate the pension wealth accrual effects and their implications for various households under a restricted set of conditions.

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[1] See SPR background study by Morley Gunderson, "Literature Review of Public and Private Financial Incentives for Retirement", 2001.

5. Key Evaluation Questions and Findings

5.1 The Literature Review

The literature review examined some 200 sources in the retirement and pensions literature. The review considered such key concepts/issues as: the definition of retirement; income-leisure choice; life-cycle factors; private and public pension wealth design features; mandatory retirement; health; labour market and other determinants of the retirement decision. The review also examined recent Canadian and U.S. research findings.

The literature review concluded that existing theoretical and empirical literature on the determinants of retirement highlight the fact that retirement decisions generally respond to market incentives such as the person's expected wage and job opportunities as well as pension benefits from public and private plans. As well, the literature emphasizes that retirement decisions are sensitive to the person's particular circumstances, especially their health and wealth (and hence ability to afford to retire). However, there has been no systematic longitudinal analysis of the relative importance of the various factors influencing the retirement decision.

5.2 Income Sources of Retirees and Pre-Retirees

What is the relative importance of different income sources to the income portion of those in the age groups (50 to 54, 55 to 59, 60 to 64 and 65 +)?

Main findings for 1995:

- ***Employment is the main source of income until age 60***, and declines thereafter.

- Employment remains a significant source of income after 60 (accounting for 35 percent and 10 percent for single men ages 60 to 64 and 65 to 69 respectively, and accounting for 25 percent and 4 percent for single women, age 60 to 64 and 65 to 69, respectively).

- Changing paths to retirement indicate a trend to a greater proportion of retirees, male and female, working past retirement age.

- ***On average, income from public pensions (OAS/GIS/SPA, CPP/QPP) is the most important source of income after 65*, rising from 20 percent to 62 percent of total income for single men age 60 to 64, and 65 to 69 respectively, and from 29 percent to 65 percent for single women in the same age groups.**

- ***The second most important source of income for seniors is private pension income (RPPs, RRSPs). For single men the importance of private pension income increases considerably after age 65***, from over 16 percent for those in the age group 65 to 69, and 20 percent for those ages 70 and over. By contrast, private pension income accounts for about 13 percent of total income for single women in either of these age groups.

- ***Couples experienced similar trends to singles.*** For couples, employment income was the main source of income before age 65, followed by private retirement income. Public retirement income dominates after age 65.

- ***The most vulnerable group is single older women (70+)***, who continue to be extremely dependent on public pensions (OAS/GIS, C/QPP), which account for 69 percent of their income (compared to 61 percent for single males in the same age group). OAS/GIS benefits were particularly important, accounting for 47 percent of their income (compared with 36 percent for single males).

Key changes in the utilization of public-private pensions and other income sources between 1989 and 1995:

- ***Generally there is a decline between 1989 and 1995 in the importance of OAS/GIS/SPA for all age groups and an increase in the proportion of incomes derived from CPP/QPP.*** For single women, age 65 to 69, the share of CPP/QPP increased from 18 percent to 24 percent, for single men, from 22 percent to 27 percent; for single women 70+, it increased from 12 percent to 21 percent; for single men 70+ from 19 percent to 25 percent. Similar trends were observed for couples.

- ***Private retirement pensions (RPPs, RRSPs) as an income source increased for many older age groups.*** These rose between 3 percentage points to 6 percentage points for single females and couples over 65 and single men over 70. It declined slightly for single men in age groups 60 to 64 and 65 to 69 and for single females in the age group 60 to 64. The declines were just over one percentage point for single men, age 65 to 69, and 4 percentage points for men in the age group, 60 to 64. For single women, ages 60 to 64, the decline was about one percentage point.

- ***There is a decline in the proportion of employment income among most of the age groups 60+ between 1989 and 1995, likely as a result of changes in the economy over this period rather than changes in retirement system features or in retirement behaviour.*** The exception was single men in the 60 to 64, and 65 to 69 age groups, which experienced increases of 6 percentage points and about one percentage point, respectively.

- ***There is also evidence of a change in the path to retirement as a significantly greater number of older men (55 to 64) indicate that they are neither employed nor retired, and a large proportion of this group is seeking a job.***

5.3 Effects of Pension Wealth Accumulation

What are the incentives and disincentives for older workers to retire arising out of the combination of public and private retirement benefits?

The analysis of retirement incentives[2] builds upon the simulation work of Gruber who examined the public pension incentives for retirement in Canada,[3] and related work by Pesando, Gunderson and Hyatt on private pension schemes of the RPP defined-benefit variety.[4] It examines a variety of pension plan features that impact on early retirement, using a measure of pension wealth accruals, or accumulations which may increase the probability of retiring in certain years. The analysis applies to a necessarily simplified set of base cases which may not be typical. In particular, the assumption is made of a continuous work history at 1, 1.5, 2, 0.10 times median wage with no interruptions, of a male, with a spouse who never worked. In respect of private pensions, the focus is on workers who have defined-benefit RPPs of varying types (less than half the workforce).

- The pension plan simulations illustrate how Canada's public and private pension system gives rise to a complex set of pension wealth accruals[5] at different ages for recent retirees who experienced a continuous work history. These positive or negative pension wealth accruals act as a form of implicit subsidy or tax on income earned in a given year. The resulting financial incentives or disincentives might potentially be expected to have important effects on retirement decisions. The wealth accruals and associated financial incentives vary by such factors as the individual's wage as well as the institutional features of defined-benefit employer-sponsored private plans (RPPs), bridging supplements (where the CPP/QPP and private pension plan integration offset is waived) and subsidies to early retirement and special retirement. When pension wealth accruals and associated financial incentives were estimated for selected households[6*] under a restricted set of conditions the following conclusions emerged:
    - In "basic" private plans (defined-benefit RPPs) with no bridging supplements and no early or special retirement features, accruals tend to increase with age, but abruptly drop to zero at the age of normal retirement of 65. This pattern potentially creates an incentive to continue working to age 65 and then to retire. Private pension plan accruals are potentially substantial, averaging around 20 percent of annual wages between the ages of 55 and 65 for a wide range of incomes. These are equivalent to an average 20 percent subsidy on more years of work.

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[2] See SPR background paper by Morley Gunderson and Doug Hyatt, "Simulations of Incentive Effects of Private and Public Pensions", 2001.

[3] See J. Gruber, "The Interaction of Public Pensions and Retirement Decisions in Canada", Massachusetts Institute of Technology, 1998.

[4] See J. Pesando, J.D. Hyatt and M. Gunderson, "Early Retirement Pensions and Employee Turnover", *Research in Labour Economics*, 1992, Vol. 13, pp. 321-337.

[5] Accruals are the annual increments in pension benefit wealth from working one more year and retiring at the end of the year. Accruals are expressed as a percentage of annual earnings in that year. They are not additive since the worker must retire at the end of the year to obtain the pension benefit accrual.

[6*] See endnote 1.

- Private pension (defined-benefit) plans with CPP bridging supplements and subsidized early/special retirement tend to create large positive spikes in pension wealth accruals at the dates when such features apply. Such spikes, followed by declining and possibly negative accruals, create financial incentives to work up to the milestone date, and to retire early.

- Although low-wage employees have smaller total private pension wealth, since it is based on their wage, their relative pension wealth accruals (expressed as a percent of their wage) is fairly similar to that of high-wage employees.

- ***Within the assumptions of the base cases, the combined effect of the public and private pension plans (defined-benefit RPPs) might potentially encourage retirement soon after 60 to maximize pension wealth for a recent retiree.***[7] For such base case workers potential disincentives (negative accruals) arising from public pensions, especially after age 60, work in the opposite direction to the incentives from the private plans (positive accruals) for employees in basic defined-benefit plans with no "early or special retirement features" at later ages but are not large enough to offset the private plan incentives. Total pension wealth accruals remain positive at least until around age 65 when they become substantially negative because of certain aspects of public plans, notably the income-testing of GIS and SPA for low-income seniors.

- For private pension plans with "subsidized and special retirement", combined pension wealth accruals are potentially very large and positive, or peak at 55 and 60, and become negative after age 60. They become negative at the age of 64 in the case of private plans with only "subsidized early retirement". After age 60, the negative accruals of the public plans augment the retirement inducing effect of the private plans.

- ***The retirement-inducing potential of both private and public pensions combined was prominent for low-wage recent retirees*** since they were more likely to experience a rapid drop in accruals, especially larger negative public pension accruals (OAS/GIS/SPA), if they continued working. There were implicit taxes as high as 50 percent on paid employment beyond age 65. This would have occurred primarily because low-wage employees faced high clawbacks[8] in income-tested public pensions (GIS/SPA) if they continued to earn income.

- ***Private pension wealth accruals are potentially zero after maximum years of service which in the modelling is age 65 in private pension plans, and they are potentially substantially negative in combined private/public plans at that age, without any special/early retirement benefits, or CPP bridging supplements.***

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[7] As already indicated the public pension side estimations are for the worker who did not take advantage of the drop-out for low or no earnings years.

[8] The GIS/SPA clawback refers to the fact that for every dollar of CPP or private pension income, GIS/SPA benefits are reduced by 50 cents. This applies to lower income retirees.

— For someone born in 1930 who worked continuously for 30 years at the median wage (with a wife who is three years younger and who never worked), positive private/public wealth accruals (or implied subsidies on continued work) peak at 73 percent at the age of 55 with a CPP bridging supplement only. This compares with the same individual in receipt of subsidized early or special retirement who would experience a peak positive wealth accrual or subsidy effect of 177 percent at the age of 60. These become negative pension wealth effects (i.e., an implicit tax) of 37 percent at age 61 on income from another year's work and a further negative accrual effect of 67 percent at the age of 65. But for the same individual positive private/public wealth accruals peak at only 18 percent at the age of 55 without a CPP bridging supplement and no subsidized early or special retirement private pension features then dipping and rising to 16 percent at age 63. These effects then drop to zero by age 65.[9]

— ***RRSPs and defined-contribution private pensions (RPPs) do not contain these retirement incentive effects.*** They do not have the clawbacks of pension benefits that exist in the public plans that are income-tested, nor do they have the early and special retirement features of private defined benefit plans. Thus, even though RRSP accumulations are important for persons at higher levels of pre-retirement income, they do not give rise to the spikes in pension wealth accruals that would influence retirement decisions at specific ages for large numbers of near-retirees.

There is some limited international comparative analysis for public pension wealth effects. Pension accrual effects at older ages are an important consideration in the retirement decision in many countries.[10] Canada compares favourably with respect to disincentives to continued working at older ages. One measure — implicit tax on further work between the ages of 55 and 69 from social security programs — suggests that work disincentives in Canada are among the lowest in the industrial world, only marginally higher than the U.S., Japan and Sweden and much lower than most Western European countries.[11]

The public and private pension system should be regarded not only as a form of saving for retirement, but also as a system that has a potentially important set of incentives that can affect retirement decisions. This analysis has not assessed the extent to which the retirement income system affects how widespread these incentives are, and the decision to retire.

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[9] Of course the actual incentive effects depend on the choices facing the individual, the conditions of his/her plan and his/her work history.

[10] See Organization for Economic Cooperation and Development, *Maintaining Prosperity in an Aging Society*, (Chapter 3 Ageing Populations, Labour markets and The Retirement Decisions), 1998.

[11] See Jonathan Gruber and David Wise, eds. *Social Security Programs and Retirement Around the World*, A National Bureau of Economic Research Conference Report. Chicago and London: The University of Chicago Press, 1999.

It is important to note that pension wealth accruals is only one measure of potential incentives to retire. For instance, even where pension wealth accruals are low or negative, the income replacement rate may be so low as to strongly encourage continued working. In addition, other factors affect an individual's decision to retire.

5.4 Empirical Analysis of Factors Influencing Retirement Planning

The analysis used econometric methods and data from the 1995 Statistics Canada GSS, Cycle 9, on Canada's changing retirement patterns. This part of the evaluation examined the importance of a wide range of factors affecting the "planned"[12] and "actual"[13] retirement decisions of Canadians. The factors included gender, education, age, health status, spouse's status, occupation, other income, region and industry. Nevertheless, data do not permit comprehensive systematic assessments of the relative importance of all the factors in the actual retirement decision.[14] Key results were:

- After controlling for other key variables, there is a very little difference in the "planned" retirement ages between males and females. Men work slightly longer (0.8 years).

- ***The "planned" age of retirement increases continuously with age, highlighting the fact that younger workers clearly plan to retire earlier than their older counterparts.*** Workers age 65 to 69 plan to retire 9 years later than workers in the 45 to 49 age group.

- The "planned" age of retirement generally increases with education, especially for university graduates who prefer to continue working and retire later.

- Persons with a spouse generally plan to retire earlier than do persons without a spouse. Furthermore, they are more likely to be retired if their own spouse is retired, highlighting the complementarity of the retirement decision within households.

- Persons whose health status was fair to excellent were likely to plan to continue working and retire later, and they were less likely to be retired. This suggests that ill-health can be an important factor inducing retirement.

- Persons in high-prestige occupations also plan to retire earlier than do persons in low-prestige occupations, and they have a higher probability of retiring.

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[12] "Planned" age of retirement is derived from the GSS Cycle 9 sub-sample of persons (1,518) over the age of 45 who in 1994 intended to retire. However, at some point such persons might have a different actual age retirement.

[13] "Actual" retirement age refers to the GSS Cycle 9 sub-sample of persons (514) over the age of 45 whose main activity in 1989 was working at a job and who retired between 1990 and 1994.

[14] This analysis is partial and indicative. For example, data bases do not at this time provide enough detail to permit the incorporation of different retirement-inducing features of employer pension plans for different categories of labour directly into such econometric analysis.

- The findings regarding the factors influencing the "actual" retirement decision (or probability of retiring) generally were consistent with those for the planned age of retirement.[15]

- After controlling for other variables believed to influence retirement decisions, there is little variation in "planned" retirement ages and retirement probabilities across provinces. Persons in the Atlantic provinces tend to plan to retire the earliest. This may well reflect the lower labour market opportunities in that region.

While the pension wealth simulation results highlight the potential importance of the financial incentives of the combined public and private pension system, the statistical results suggest that these potential incentive effects might have consequences for the planned age of retirement and on the actual retirement decision. This is supported by the following indirect rather than causal evidence, which highlights the importance of private pension provisions in particular:

- Data on the "planned" age of retirement showed strong spikes at the same ages (55 or 60) as the spikes in pension benefit accruals in the illustrative (base case) employer pension plans.

- Persons with an employer pension plan have an expected age of retirement that is 1.3 years younger than persons without an employer pension plan.

- Persons, age 45 and over, with an employer pension plan were over 20 percent more likely to retire than were persons without a plan.[16]

- The greater likelihood of males retiring (5 percent) may reflect the fact that they are more likely than females to have accumulated the private pension plan and CPP/QPP service credits, and seniority based wage increases that make early retirement attractive in define-benefit (final-earnings) plans.

The statistical analysis provides indirect evidence pointing to the potential retirement-inducing effect of private defined-benefit pension plans (which emanate from such features as early, special and postponed retirement) and of their complementary public pension plans. As discussed earlier, the early and special retirement features create large spikes in pension wealth accruals at the ages at which they first apply, typically age 55 and 60 respectively which is an incentive to retire at those milestone ages. Retiring prior to those ages would involve forgoing the pension wealth accruals, and retiring later would not lead to any further pension wealth accruals.

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[15] The planned age of retirement measure was likely a more reliable measure of such intentions for the pool of potential retirees. This is because those who had already retired were not in the data set of potential retirees.

[16] It is 2.4 years younger for persons without an employer pension plan when those who indicated they will "never retire" are distributed with later retirement ages according to their remaining life expectancy

This evidence is indirect since the available data does not permit incorporating the different features of employer pension plans into estimations of the determinants of retirement decisions. Nevertheless, the evidence suggests that employer pension plans might potentially facilitate and induce early retirement, through the financial security they provide and the incentives they create.

5.5 Other Related Issues Examined

Other issues are examined more summarily. The examination is not a complete assessment of any of these issues, but does provide some indications for further research.

Are there cross-subsidies across generations, between income classes and by gender inherent in the system of public and private retirement pensions and its component parts?

In the private pension system, ***intergenerational subsidies across different age groups*** are not likely to be substantial, since pensions are part of total compensation packages. To the extent that subsidies are involved in the case of defined-benefit pension schemes, they should be regarded as intertemporal-subsidies for a given worker over his/her lifetime. They are not intergenerational subsidies across different workers of different ages. There may be *ex post* (after the fact) windfall gains or losses, depending upon the market return on the pension fund, and those gains or losses may be distributed across different generations of workers. But there are generally no *ex ante* (before the fact) intergenerational subsidies.

Generous early retirement packages, for example, may not be so much a transfer from younger workers to older workers, as they are an alternative to seniority-based wage increases or the continued payment of deferred compensation or more generous health benefits — all of which otherwise would have benefited older workers. In these defined-benefit plans the benefits are simply a proportion of earnings.

In defined-contribution private pension plans there is no apparent direct intergenerational subsidy since recipients essentially receive whatever the market earned on their contribution.

The clear exception is in unionized environments that have defined-flat- benefit plans. The benefits in these plans are often calculated as a flat amount per month and on the basis of years of service. In this case intergenerational subsidies could be more substantial and favour older workers, because union policies are often more heavily influenced by the median union voter who is likely to be older and interested in pension plan features.

Intergenerational transfers are an essential and unavoidable characteristic of introducing a pay-as-you-go public pension scheme like CPP as originally conceived. They arose because early generations of CPP contributors paid a lower rate for shorter periods[17] to receive similar benefits. This effect of a rapidly introduced and primarily pay-go contribution scheme of the CPP was projected to continue beyond 2030 under the previous rules, but under the 1997 legislation contribution rate increases are slated to cease by 2003 when the rate reaches the "steady state" level of 9.9 percent. Social safety net programs (OAS/GIS/SPA) and the compulsory and contributory CPP, however, also reduce the risk of personal hardship in old age. This in turn, stimulates labour productivity, business activity and economic growth.[18]

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[17] This only applies to contributors who were age 18 before 1966. It is fully phased-in for contributors reaching age 65 after 2011.

Of course, many other intergenerational transfers exist both in public spending and private transfers (e.g. from parents to their children or heirs). The exact magnitude of any intergenerational transfer (in this case from younger to older workers) associated with public pensions is difficult to determine since it depends upon lifetime contributions as well as expected benefits — and these are changing.[19]

Registered Retirement Savings Plans (RRSPs) can involve intergenerational transfers since they confer a tax advantage to current generations who utilize RRSPs. But significant tax revenues on RRSP draw-downs will accrue to the federal and provincial governments when contributors retire.

The ***cross-subsidies by income class*** occur with respect to RRSPs since higher-income persons tend to utilize them more and they benefit more from the tax advantage given their higher marginal tax bracket. With respect to private pension plans there are unlikely to be substantial cross-subsidies with respect to income class. In defined-contribution plans, recipients receive what their plan earns in the market, although RPPs (like RRSPs) are tax sheltered investments implying interpersonal transfers to those who contribute to them.

The defined-flat-benefit plans that predominate in the union sector can confer a cross-subsidy across income classes because the flat benefit is a larger relative proportion of earnings for a low-wage individual than for a high-wage individual in the same pension plan.

With respect to public pension plans, some cross-subsidies can exist by income classes even though the general CPP/QPP benefits are based on earnings. Many of the features of public pension plans are designed specifically to be progressive, providing disproportionate benefits for lower-income persons.

Defined contribution plans have ***no cross-subsidies by gender*** since the benefit is based on market returns on the contributions. However, defined-benefit plans (either flat-benefit ones or earnings-based ones) can have such subsidies. Women may disproportionately benefit from such plans who have a similar work history to men since they have longer remaining life expectancies than do men. They can expect to receive pension benefits in addition to survivor spousal benefits for a longer period of time. But many women are more likely than men to accumulate lesser pension credits on lower earnings than men. The exact nature of any cross subsidy, however, has not been documented since that depends upon individual contributions which vary within age cohorts as well as pension receipts.

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[18] The justification for such transfers was addressed in the CPP Phase I Retirement Benefits, Evaluation Report, July 1995.

[19] CPP as redesigned by the 1997 legislation is expected to have constant and near constant contribution rates across generations.

With respect to public pensions, similar differences prevail between men and women. Women are more likely to be employed in non-standard jobs (e.g. part-time, temporary or self-employed) which frequently do not offer pension coverage. Also, their lower earnings and work experience mean they would receive lower CPP/QPP benefits. However, women may receive benefits longer because of their greater life expectancy, and their benefits may be topped up at some point by spousal survivor benefits. Furthermore, because of their lower income status, they are more likely to be eligible for the income-tested benefits (GIS, spousal allowance, and provincial social assistance).[20] In this sense GIS can be seen as a cross-subsidy to poorer members of society.

Are older workers getting back what they put into the retirement income system? Will they in the future?

Current pensioners, and to a lesser extent current older workers (above age 50) are generally getting a relatively high return from their C/QPP contributions when considered as an investment. This result occurs mainly because of the pay-as-you-go nature of the CPP/QPP and the CPP/QPP planned maturation process which enabled early beneficiaries with as little as 10 years in contributions following the introduction of these programs to receive full benefits.[21]

The amounts that older workers and retirees get back for their investments in RPPs and RRSPs depend entirely on the type of RPP (the benefit formula), the investment choices and the returns with respect to RRSPs. It would also depend on their work/earnings patterns.

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[20] This later effect, however, should not be regarded as a cross-subsidy in favour of women. Rather, it is a result of their generally lower-earnings status making them more eligible for these kinds of income-tested transfers.

[21] For workers born in 1929 the internal rate of return to CPP contributions in real terms (net of inflation or increases in consumer prices) was 10.1 percent, while for those born in 1948, 1968 and 1988, the internal rate of return was 4.9 percent, 2.5 percent and 1.9 percent respectively, and this after taking into account the contribution rate increases as a result of the 1998 amendments to the CPP which will raise contribution rates from 5.85 percent in 1997 to 9.9 percent in 2003. See Office of Superintendent of Financial Institutions, *Canada Pension Plan Sixteenth Actuarial Report*, September 1997. Younger generations would have been less likely to get back what they put into the retirement income system in the future, in the absence of recent amendments to the CPP, which were designed to strengthen financing, improve investment practices and moderate costs (federal Budget Papers, February 24, 1998).

How actuarially neutral is the system of public and private pensions at different ages of retirement?

Substantial pension wealth transfers to early and special retirement occur where the actuarial adjustments to defined-benefit private pension plans are insufficient to offset the fact that the pension is received earlier and for a longer period of time.

The subsidies are particularly pronounced under defined benefit plans with special retirement (typically around age 60) when there is no actuarial reduction and an unreduced pension is received at that age.

Since 1987 CPP benefits have been payable at age 60 (QPP since 1984) on an actuarially reduced basis on the condition that the recipient has "substantially ceased working".[22] CPP benefits can be delayed until as late as age 70 in which case annual benefits are actuarially increased to compensate for the fact that they will be received later and for a shorter period of time. Other pension vehicles like RRSPs and defined contribution pension plans have no actuarial implications. OAS has a fixed eligibility age and hence no actuarial effects can be imputed.

Is the design of the public/private retirement system consistent with a conventional retirement age of 65?

The fact that pension wealth accruals are potentially zero or negative at age 65 in private pension plans, and negative in public plans at that age for those entitled to GIS, suggests that the retirement income system may discourage lower income persons who wish to continue working and delay their retirement beyond age 65. The findings indicate that while age 65 is still the most common planned age of retirement, only about one-fifth of the workforce plan to retire at that age. The retirement plans of the vast majority are spread over other ages, notably 55, 60 and even later than 65. The analysis also found that age 55 replaced age 65 as the most common planned age of retirement for younger persons. Overall, the planned age of retirement was substantially earlier for younger workers.

But for some groups there is also a preference for delayed retirement, or at least flexible retirement, which may conflict with the incentives of the private and especially certain aspects of the public pension system that may penalize continued employment. That is the income-test on earned income arising out of public GIS and SPA may be ill suited to accommodate the potential desires of some groups (particularly low income, older workers) to continue working at older ages. So might the requirement that someone has substantially ceased working for CPP/QPP eligibility prior to age 65. Therefore, the private and public retirement system might consider ways to facilitate — rather than discourage — continued employment at older ages, and following retirement where older workers prefer continued labour force attachment. This consideration would need to encompass other considerations, such as the rationale for income-testing (clawbacks) on basic income support programs such as GIS, SPA in order to target them.

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[22] In this case employment earnings must be less than the maximum CPP/QPP benefits payable at age 65. The adjustment in the pension based on years of entitlement is 0.5 percent per month upward between the 65th and 70th birthday or downward between the 60th and 65th birthday.

Are there trends in registered pension plan design such as any move away from defined-benefit to defined-contribution schemes?

Statistics Canada data suggests that the shift from defined-benefit to defined-contribution plans is not significant. An analysis of RPP membership indicates that roughly 88 percent of employees in RPPs were covered by defined-benefit plans at the start of 1996, down slightly from 91 percent at the start of 1990.[23]

Current and potential future regulatory constraints on defined-benefit plans (e.g. portability requirement, mandatory indexing, pro-rating for part-time employees, or the requirement that employers actuarially adjust pension benefits if the employer postpones retirement beyond the normal retirement age) may shift workers into defined-contribution schemes. But defined-benefit plans may also remain attractive because of their potential positive effects on the labour productivity of many employees who want to know what pensions they will receive in retirement and the strong preference shown by unions.

What is the potential substitutability of public pensions for potentially what might become less generous private registered pension plans?

It is not the objective of the public pension system to substitute for private pension plan benefits (RPPS, RRSPs) that become less generous. The public system (CPP/QPP, OAS/GIS/SPA) is designed to provide a modest base on which to build additional private income for retirement.

Coverage under private RPPs is currently incomplete.[24] However, the ability of the private pension system to provide retirement income may be constrained by the changes in the nature of work, especially the growth of non-standard employment[25] although RRSPs remain available to all workers.

These circumstances highlight the importance of considering ways to remove barriers that may inhibit older people from continuing to work if they are able and willing, and to ensure that employees in non-standard work are able to obtain adequate private pension coverage.

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[23] Statistics Canada, Pensions Plans in Canada, January 1, 1996.

[24] At the beginning of 1996, 34 percent of the labour force and 42 percent of paid workers (i.e., excluding the self-employed in unincorporated businesses, unpaid family workers and the unemployed) were covered by RPPs in Canada. See Statistics Canada, Pensions Plans in Canada, No. 74-401XPB, January 1996.

[25] See Townson, Monica (1997). Non standard employees are those with part-time employment, who are multiple job holders and who are self employed.

What are the potential implications for EI take-up rates and the EI program generally, of the public and private financial incentives for retirement of older workers?

There are no obvious implications for the EI system. Persons who respond to the early retirement incentives of private pension plans may well return to the labour force and enter the state of unemployment as they engage in job search. But this phenomenon is unlikely to be substantial. Retiring in response to the financial incentives of the retirement pension system generally means that the individual has the means to be able to afford to retire. This is especially the case for high-wage persons. Low-wage persons may have a financial need to return to the labour force and look for continued employment, but they may have little financial incentive to do so given the high clawback rates they face if they earn additional income.

6. Suggestions for Future Research

A number of directions are suggested for future research. These include the following:

- **Further Data Development:** There is a need to incorporate the different features of employer pension plans directly into the equations on the retirement decision. This requires a data set that provides detailed information on the individual's type of private pension plan (e.g., defined-contribution, flat-benefit, final-earnings) as well as measures of the potential generosity of those plans such as their benefit formula, early and special retirement features, and bridging supplements. The data set should also include information on such factors as the individual's age, earnings and pension service credits.

  The analysis highlighted the diversity in retirement preferences, with younger people planning to retire earlier, but substantial numbers of persons wanting to delay retirement and continue working. Further analysis is merited concerning the implications of these various preferences. For example, It would be useful to have more information on the barriers that inhibit or discourage older workers and retirees from continuing to work (part-time, full-time) if they so choose.

- **Other types of research**: Smaller micro-studies may also be useful. One example would be to take a closer look at the way in which people think about the retirement decision. This would include examining the degree to which people are aware of the incentives in private and public plans and the degree to which they factor these incentives into their retirement planning.

- **Evaluation Link-ups:** The above directions for future research would also serve the ongoing evaluation needs of the department, including the next evaluations of OAS, CPP, systems of federal programs (CPP/OAS) and tax-assisted private pension instruments (RPPs, RRSPs). Related evaluation issues could include the diversity in retirement preferences and the impacts of various configurations of systems of public and private pension plans on the retirement and work preferences of older workers. In the case of data considerations, it is important to consider in advance what the data development implications might be for improving the sensitivity and utility of these next evaluations.

7. Summary of Main Findings

7. 1 *Income Sources of Retirees and Pre-Retirees*

Employment remains the main source of income until 60, while income from government pensions (OAS/GIS/SPA, CPP/QPP) is the main source of income after 65. At the same time the importance of private pension income increases considerable after 65. The most vulnerable group is single older women (70+), who continue to be extremely dependent on public pensions (OAS/GIS, CPP/QPP), with OAS/GIS, representing 47 percent of their income compared with 36 percent for single males.

There have been notable changes in the utilization of public-private pensions and other income sources between 1989 and 1995. Generally, there has been a decline between 1989 and 1995 in the importance of OAS/GIS/SPA for all age groups and an increase in the proportion of income derived from CPP/QPP. Private retirement pensions as an income source increased for many older age groups, but declined slightly for single older men in the age groups 60 to 64 and 65 to 69 and for single females in the 60 to 64 age group. There was a decline in the proportion of employment income among most groups age 60+ between 1989 and 1995, likely as a result of changes in the economy over this period rather than changes in the retirement system. The exception was single men in the 60 to 64, and 65 to 69 age groups, who experienced a slight increase in the proportion of employment income.

7.2 Effects of Pension Wealth Accumulation

For private pension plans with "subsidized and special retirement" provisions, combined pension wealth accruals are potentially very large and positive, or peak at 55 and 60, and become negative after age 60. The combined retirement-inducing effect of both private and public pensions is especially prominent for low-wage workers. This occurs primarily because low-wage employees face clawbacks in income-tested public pensions (GIS/SPA) if they continue to earn income. The combined effect of the public and private pension plans (defined-benefit RPPs) is generally to encourage/provide incentives for early retirement soon after 60.

RRSPs and defined-contribution private pensions (RPPs) do not contain these retirement incentive effects.

The public and private pension system should be regarded not only as a form of saving for retirement, but also as a system that has a potentially important set of incentives that can affect retirement decisions.

7.3 Some Factors Influencing Retirement Planning

The planned age of retirement increases continuously with age, highlighting the fact that younger workers plan to retire earlier than their older counterparts. There are no significant differences in the planned age of retirement for men and women, however. The planned age of retirement increases with education (e.g. university graduates plan to work longer), with better health, and with an employer pension plan. Persons with a spouse generally plan to retire earlier than do persons without a spouse. Furthermore, they are more likely to be retired if their own spouse is retired, highlighting the complementarity of the retirement decision within households.

The statistical analysis also suggests that the potential pension wealth incentive or disincentive effects have an impact on the planned age of retirement and on actual retirement decisions. People's planned age of retirement have strong spikes at the same ages (55 or 60) as the spikes in pension benefit accruals in typical employer pension plans. Persons, age 45 and over, with an employer pension plan were over 20 percent more likely to retire compared to persons without an employer pension plan. Men were more likely to retire earlier (5 percent) than women reflecting the fact that they are more likely than women to have accumulated the private and public (CPP/QPP) pension service credits, and the seniority based wage increases that make early retirement attractive in the case of final-earnings plans.

The statistical analysis provides indirect evidence pointing to the potential retirement-inducing effect of defined-benefit pension plans (which emanate from such features as early, special and postponed retirement) and of their complementary public pension plans.

7.4 Other Issues Examined

- Inter-generational subsidies are unlikely to be substantial in private pension plans, but are noteworthy in the public plans. There are few private pension cross-subsidy effects, but some significant public ones (GIS, SPA). For example, RRSPs tend to provide more benefits to higher-income groups, while OAS/GIS/SPA and CPP/QPP provide income floors for low-income persons. The public-private pension system may involve little cross-subsidy by gender, because the potential sources of these subsidies tend to offset each other.

- Recent evidence suggests that the "normal" retirement age of 65 is no longer "normal", — and a substantial number of seniors (including retirees) are working. At the same time pension wealth accruals are typically zero at age 65 in private pension plans, and substantially negative in public plans. This suggests that the retirement income system is geared to discouraging retirement beyond the age of 65 even though some may choose or prefer to continue working. For younger persons the most common planned age of retirement is 55, not 65.

- There are no obvious implications for the EI system.

1. Introduction and Background

1.1 Objectives and Policy Issues

In late 1997, Human Resources Development Canada undertook an Evaluation of Public and Private Financial Incentives for Retirement. The evaluation was aimed at examining the potential impact of public and private financial incentives for retirement, associated issues and related program implications.

The evaluation was carried out by SPR Associates of Toronto with a team led by Morley Gunderson and Doug Hyatt of the Centre for Industrial Relations, University of Toronto. This study is one of an ongoing series of studies of retirement and work. Its generality is limited by the fact that its analysis is based on particular cases, which are not necessarily typical.

Objectives

The main focus of the evaluation is to examine the potential impacts of public and private financial incentives for retirement on individual older workers' decision to retire.[26] It examines the current financial incentives or disincentives to continue working or to retire, which arise from the public and private pension programs and the tax system. The public system is seen as including the Old Age Security (OAS) and the Canada/Quebec Pension Plan (CPP/QPP).[27] The private retirement investment vehicles comprise Registered Pension Plans (RPPs), and Registered Retirement Pension Plans (RRSPs), although the main focus of the analysis on the private side is the category of RPPs with incentive or disincentive effects.

The central issues addressed in the evaluation include:

- the potential incentives and disincentives for older workers to retire arising from public and private retirement benefits under a restricted set of conditions;
- the relative importance of the various factors affecting the retirement decisions; and
- the relative importance of different income sources to the income position of older age groups before and after retirement.

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[26] Only some older workers are able to choose when to retire with a fully adequate pension, while others are forced into retirement and obtain less than adequate pensions. Some need to seek re-employment. Still others may choose to partially retire, and to begin new careers.

[27] CPP Disability benefits, although considered to serve as a "bridge to retirement" for some workers, is not included in this analysis. This is because that would require a consideration of the contribution of complementary programs like those of the Workers' Compensation Boards, Provincial social assistance and private long-term disability insurance for the same purpose. For the same reason, this analysis also excludes the impact of Employment Insurance Sickness Benefits.

Some other contextual issues also examined in this evaluation include:

- whether there are cross-subsidies across generations, between income classes and by gender inherent in the public and private retirement system and its component parts;
- whether older workers are getting back what they put into the public/private retirement income system;
- the actuarial neutrality of the system of public and private pensions at different ages of retirement;
- the coherence of the public/private retirement system and its consistency with a conventional retirement age of 65, and with the need to encourage continuing labour force attachment by older workers below the age of 65;
- the potential implications for EI take-up rates, and the EI program generally, of public and private financial incentives for retirement of older workers;
- whether there are any trends in registered pension plan design such as a move away from defined-benefit to defined-contribution schemes; and
- the potential substitutability of public pensions for what might become less generous private registered pension plans.

In addition, the report examines future directions in this research area, asking specifically, "What further research and data compilation is necessary to provide policy guidance in this area?"[28]

Policy Issues

The decision of older workers to retire, either fully or partially from the labour market, has important implications for a wide range of policy issues. The importance of retirement decisions will grow in the near future as the large baby-boom population (born between 1947 and 1967) enters the age range when early retirement decisions are typically made.

Retirement can be a form of intergenerational worksharing, freeing up jobs and promotion opportunities for younger workers. However, retirement also reduces the experience level of the work force. The recent downsizing that has occurred in many organizations, often in the form of early retirement programs, has given rise to some reconsideration of the viability of this approach to the extent that it has resulted in the loss of valuable talent with accumulated firm-specific knowledge and networks. Also, the prospects of impending labour shortages could increase job opportunities for older workers, especially if their individual preferences for part-time retirement mesh with the needs of employers for a flexible work force.

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[28] Some evaluation issues such as pension net income replacement effects could not be addressed due to modelling choices, the decision not to employ MAPSIT, which was not deemed suitable for the main focus of the analytical work, and the lack of detailed data on pension plans and their characteristics. But other analyses have been added, more detailed analysis of representative pension plans and accruals, and an econometric or statistical analysis of the determinants of the retirement decision.

When the large cohort of the baby-boom population retires, more concern may also shift to the cost implications of sustaining their retirement income, health care and other expenditures of aging. These cost issues may be exacerbated by longer life expectancies and the relatively slower growth of the labour force resulting from the reduction in the birth rate (to the extent that this is not offset by future immigration policies).

Concern regarding public pension issues were a significant factor leading up to the Canada Pension Plan and Quebec Pension Plan reforms which were legislated in the late 1990s. Under the 1997 CPP legislative changes, contribution rate increases are slated to cease by 2003 when the rate reaches the "steady state" level of 9.9 percent. All future generations of CPP contributors will be subject to the same rate of contributions which will not exceed 10 percent (equally cost- shared by employers and employees).

In a related vein, the expectations of post "baby boom" younger populations regarding their own retirement may be another issue for public policy and retirement incentives. This report notes the extent to which younger people today appear to have expectations of a very early retirement. Such expectations may be contrary to the financial burdens these groups may face in meeting the costs of pensions, health and other expenditures of the retired baby-boom generation and in meeting their own household requirements, including the cost of raising and educating children.

Overall, the retirement decisions of individual workers have important policy implications because retirement has many impacts as noted above: opening job vacancies for younger workers, reducing the experience level of the work force, and adding to the cost of public pensions and income support. The importance of these impacts is heightened by the fact that the retirement decision is influenced by a wide array of public and private programs that are potentially subject to a considerable degree of policy control.

Understanding the causal linkages whereby pension programs and various policies influence retirement decisions, and having information on the empirical magnitude of the effects, will be useful both for determining how policy changes may influence retirement behaviour and for predicting changes that may occur in the future as the underlying causes of retirement decisions change.

1.2 Methodology and Plan of the Report

The study began with an extensive review of data and modelling alternatives for the examination of public-private pension retirement incentives (Gunderson, 1998), and an extensive review of the literature.

A rigorous review of data sources considered details of a wide range of information sources, primarily Statistics Canada data. Those examined in detail included the Labour Market Activity Survey (and predecessors), the *Survey of Labour and Income Dynamics (SLID), the Survey of Work Arrangements*, the *Labour Force Survey, the General Social Survey series, the Survey of Consumer Finances, the Survey of Aging and Independence, and the HRDC Longitudinal Labour Force Database* (compressing the T-1/T-4 Revenue Canada tax files, the Record of Employment and UI/EI Claims Status Vector). The decision was made, as discussed in background study to this report, to employ the GSS as a main source for the exploratory econometric analyses, and the Survey of Consumer Finances as a source for purely descriptive data on the retirement population.

The review of modelling approaches considered a wide range of conceptual definitions of retirement and approaches to econometric specification of the retirement decision. (Gunderson, 1998). Simulation models examined (also discussed in Gunderson, 1998) included DYNACAN, MAPSIT, the Gruber (1997) simulation of retirement incentives in public pensions, and the Pesando and Gunderson (1988, 1991) and Pesando, Hyatt, Gunderson (1991) modelling of private pension plan incentives. A meld of the Gruber and Gunderson et al models was employed for the analysis. (See Gunderson (1998) for details).

The literature review examined 200 sources in the retirement and pensions literature (see bibliography attached). The literature review placed special attention on such issues as: definition of retirement (a complex issue overall, and one dealt with in many different ways in the literature and in data sources); income-leisure choice; life-cycle factors; pension wealth and design factors; mandatory retirement; health; labour market and other determinants of the retirement decision; and findings (and discussions of data in current use) including U.S. research experience.

Overview of the Report and Applied Methodologies

Additional comments on methodology are provided within each chapter, but an overview is provided here:

- ***Chapter 2*** presents descriptive background data on the retired population and (for contextual purposes) certain comparisons to the non-retired population. To this end, this chapter provides a view of the relative importance of public versus private pensions in the incomes of those who retire; and other topics, such as the changing paths to retirement, and impact of work on well-being in retirement. These issues are examined relying mostly on the Statistics Canada *Survey of Consumer Finances* (1995 and 1989), with some data from the Statistics Canada 1995 *General Social Survey (GSS)*, Cycle 9, which examined Canada's changing retirement patterns. The use of this later data source provides some continuity, since the key statistical estimations within are done with the GSS.

- ***Chapter 3*** is an examination of the literature[29] on the retirement decision, including an examination of the difficult issues in defining retirement (and the many ways that researchers and data gatherers have defined it), and attendant difficulties of research in this field. This chapter also examines key factors in the retirement decision, including pension plan characteristics, mandatory retirement rules, and other factors such as health, family situation and so on. (It should be noted that there has been no systematic longitudinal analysis of the relative importance of the various factors influencing the retirement decision).

- ***Chapter 4*** provides estimates of pension wealth effects for selected households. It examines a variety of pension plan features that affect early retirement, including pension wealth accruals, and "spikes" (accumulations) in those accruals at key years, which may increase the probability of retiring at certain ages.[30]

- ***Chapter 5*** examines the retirement decision directly, to identify factors affecting the retirement of Canadians. This exploratory analysis relies on an econometric analysis of data collected in the GSS, Cycle 9, 1995.

- ***Chapter 6*** discusses other related or peripheral issues included in the Terms of Reference: cross-subsidies by generation, income class, and gender; trends in RPP uptake; implications for the EI program; etc.

- ***Chapter 7*** concludes the report by examining the next steps in terms of directions for future data collection and research.

Limitations

Certain limitations in the analysis must be noted:

- First, in all of the data sources used in the analysis, it was not possible to integrate directly data on the details of private pension plans. This issue and possible remedies are discussed elsewhere (Gunderson, 1998), and identified as an area for future research in the final chapter of this report. Nonetheless, analyses are conducted in this report which separately examine the implications for the retirement decision of private and public pension features and the determinants of the retirement decision. These are then linked indirectly to results from other data sources to generate indicative findings in this regard.

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[29] See SPR Associates background studies by Morley Gunderson in "Literature Review of Public and Private Financial Incentives for Retirement", 2001.

[30] This is based on SPR's background study for this evaluation by Morley Gunderson and Doug Hyatt. "Simulations of Incentive Effects of Private and Public Pensions". 2001.

- The analysis applies to a necessarily simplified set of base cases which may not be typical. In particular, the assumption is made of a continuous work history at the median wage with no interruptions, of a male, with a spouse who never worked. In respect of private pensions, the focus is on workers who have defined-benefit RPPs of varying types (less than half the workforce).

- Second, the data sources utilized did not allow for extensive longitudinal analysis. For example, the Survey of Consumer Finances, which is used for most descriptive data in Chapter 2, does not allow tracking of the retirement decision through time, or comparison of the retirement and pre-retirement characteristics of individuals who are retired, such as income before retirement.[31]

- Third, definitions of retirement are difficult and highly variable, as is pointed out in discussions of this issue in the literature review (Chapter 3). This means that some analyses, for example, in the Consumer Finance Survey tables, must rely on age alone, or receipt of CPP/QPP as an indicator of retirement, when ideally a more complex indicator would be used.

Some further observations on data limitations and how they could be better dealt with in the future are provided in Chapter 7.

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[31] Some specialized data issues should also be noted. For example, most of the Canadian surveys examined are surveys of the resident population of Canadians. The fact that these surveys miss the substantial population of Canadians who have retired and "moved to Florida" or other jurisdictions may exclude an important sub-group. This group might be captured in part or whole by some data sets (tax filer information).

2. *Profiling the Retired and Pre-Retirement Populations*

The following chapter presents descriptive background data on the retired population and (for contextual purposes) certain comparisons to the non-retired population, particularly in the years which precede a typical age of retirement (for example those age 50 to 54 would almost always be in their "pre-retirement years"). This background information is useful in general for positioning any thinking on public-private incentives for the retirement decision. It provides a picture of who is retiring, who is not, and what their circumstances are.

To aid the goal of placing the report in context, this chapter provides several descriptive analyses relying mostly on the *Survey of Consumer Finances* (1989 and 1995), and with some data from the GSS, *Cycle 9*, which examined Canada's changing retirement patterns.

Statistical tables from these data sources are presented and briefly discussed in each of the following areas: the importance of public versus private pensions in the composition of incomes in 1995 for various age groups (i.e., age groups where most members have generally retired as compared to those approaching retirement); changes in employment and public-private pension utilization between 1989 and 1995; plus topics, such as the changing paths to retirement, and the impact of work on well-being in retirement.

The GSS, Cycle 9 data provide a broader view of these populations and issues, and many of the GSS insights are pertinent to understanding retirement decisions and the context within which these decisions take place. For example, the GSS data and analysis indicates: the significance of those who are retired as a group in Canada's total population; the increasing role of post-retirement employment (much of it part-time or temporary employment) among retired persons; the shift away from retirement at age 65; the tendency for individuals to retire earlier; a tendency for retirees to report enjoying life more; and a tendency for younger people to have strong expectations of early retirement.

2.1 A Picture of the Pre- and Post-Retirement Populations

A key issue in the retirement decision and its study is deciding when people have actually retired. As discussed in the literature review presented in Chapter 3 (see Section 3.1), there are many definitions of retirement. Whichever definitions are used, it is clear that retirement or the decision to retire is not as clear-cut as may have been the case in the past. For example, many people "retire" today in the sense that they retire from one job, or begin to collect pensions, but still continue to work or look for work. The extent of this work is an interesting phenomenon.

In 1994, 11.2 percent of Canada's population age 15 and over was retired, about the same proportion as in 1989 (11.4 percent). This proportion was higher among men (14 percent) than women (8 percent).

Nonetheless there has been a change in the road to retirement (See Exhibit 2.1):

EXHIBIT 2.1*

Changing Paths to Retirement, 1989 to 1994

	1989			**1994**		
Age Group	**Working at a job**	**Retired**	**Other**	**Working at a job**	**Retired**	**Other**
(Men)						
50-54	81%	5%	14%	85%	3%	12%
55-59	75	15	10	69	14	17
60-64	54	42	4	41	45	14
65-69	21	74	5	16	78	6
70-74	N/A	92	N/A	10	87	N/A
(Women)						
50-54	58%	3%	39%	60%	2%	38%
55-59	50	7	43	47	9	44
60-64	26	20	54	23	22	55
65-69	6	43	51	8	33	59
70-74	8	47	45	5	42	53

***Source: Statistics Canada General Social Survey, 1989, 1994. The "other" category is composed mainly of those who reported their main activity in the week preceding the survey as "looking for a job", "keeping house", or "had a long-term illness".**

Among men age 60 to 64, the proportion of those employed dropped from 54 percent in 1989 to 41 percent in 1994, but there was not a commensurate increase in retired persons. Rather there was a significant rise in the proportion of men in this age group who reported another activity. In 1989, the proportion was 4 percent compared with 14 percent in 1994. In the latter year, among this group, 6 percent reported they "had a long-term illness", and 3 percent reported they were "looking for a job". Similar trends are observed for the 55-to 59-year-old men. In 1994, of the 17 percent reporting some other activity, 8 percent reported they were "looking for a job", and 5 percent said they "had a long-term illness". This trend was not noted among older-aged men, however.

As Exhibit 2.1 also indicates, the majority of women age 60 and over did not belong to the retired population, since they had never been in the labour force or did not identify themselves as retired. This will likely change in the future with the rise in female labour force participation rates.

A retired person in this case was defined as a previously employed individual who reported retirement as his or her main activity during the week preceding the GSS surveys. Employment after retirement is further discussed in section 2.4 using Survey of Consumer Finances data.

2.2 The Importance of Various Sources of Income to Retirement and Pre-Retirement Age Groups

The evaluation question examined in this section is: What is the relative importance of different income sources to the income position of those in the age groups 50 to 54, 55 to 59, 60 to 64, and 65 plus?

To examine the relative importance of different income sources to persons who retire, and how the importance of these sources varies as individuals move from work to retirement, we examined the reliance of different age groups on different sources of income, using the 1989 and 1995 Survey of Consumer Finances. This analysis examined six age groups: under age 49, and five-year increments to age 69, and age 70 and over. Separate tables were computed for single males, single females, and couples. Income sources examined included: ***private income*** such as employment income, investment income, private retirement pensions (including employer pensions, RRSP annuities, etc.), ***government income*** from sources such as CPP/QPP, Old Age Security, Social Assistance, Employment Insurance, the Child Tax Credit, other government income, and ***other money income***.

Sources of Income in 1995

As can been seen in Exhibits 2.2A, 2.2B, and 2.2C, income sources vary greatly in importance for these age groups, particularly around transitions across popular retirement age milestones in certain public and private plans (e.g., age 55, 60 and 65). These key ages in retirement decisions are discussed in greater detail in the literature review, and in the pension wealth accrual simulations and econometric analyses presented in Chapter 3 to 5. Some key income patterns evidenced in 1995 are summarized below.

Single Males

- Employment income was the main source of income for single males under age 55 (just under 80 percent of income for those under age 49, and about 63 percent for those age 50 to 54 as per Exhibit 2.2A).

- Employment income remained a significant source of income for single males ages 55 to 59 (61 percent of income), and those ages 60 to 64 (35 percent of income).

- Employment income still remained important (10 percent of income) for single males ages 65-69, indicating that many Canadian men still work past age 65. This declined to only 2 percent of all income for those over age 70, revealing that very few males over age 70 are still in the labour force.

- Income from government pensions (OAS/GIS, CPP/QPP) increased dramatically for single males at age 65, while private pensions increased steadily from age 55 onwards:
  - OAS income in the form of Spouses Allowance[32] benefits rose from 2 percent of income for males ages 60 to 64, to 35 percent for those ages 65 to 69, when the basic OAS and GIS benefits become available;
  - CPP/QPP income increased from 6 percent of income for those age 55 to 59,[33] to 18 percent of income for those age 60 to 64, and to just over 25 percent for those over 65; and
  - private pension (RPP, RRSP) income increased steadily with age, from about 3 percent of income for those ages 50 to 54, to 7 percent for those age 55 to 59, rising to over 16 percent for those ages 65 to 69 and 20 percent for those age 70+.
- Single males under 49 relied heavily on social assistance for income, which was their second most important source of income. Reliance on social assistance was even high among those age 50 to 64, reflecting apparently the importance of social assistance to those not yet eligible for OAS/GIS or CPP/QPP.

Single Females

- Single females had steadily declining employment income after age 55 (Exhibit 2.2B), as observed for single males (Exhibit 2.2A), but single females had less income from earnings than males in every age group over age 50.
- The central role of OAS for females was indicated by the fact that OAS accounted for more than 40 percent of incomes for females over age 65, with singles females obtaining smaller amounts of their income from CPP/QPP than did males (24 percent of incomes for those age 65 to 69, and 21 percent of income for those age 70+) and private pensions (about 13 percent of incomes).
- Single females under age 49 were less likely than single males to rely on social assistance, but females ages 50 to 59 were more likely than males to rely on social assistance.
- Single females age 55 to 59 were more likely than males to rely on CPP/QPP.

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[32] Spouses of OAS/GIS recipients, or single survivors, between the ages of 60 and 64 can receive the Spouses Allowance benefit if they meet the income test and residency requirement (10 years) criteria.

[33] These CPP/QPP benefits would either be disability or survivor benefits, since the first year of receipt of a reduced CPP retirement benefit would only occur at age 60. The latter discounted benefits are reduced by 0.5 percent per month below the age of 65, when full CPP/QPP retirement benefits are available.

Couples

- Generally employment was more likely to be an income source for couples (Exhibit 2.2C) below the age of 65. For example, employment income was 68 percent of income for couples ages 55 to 59, as compared with 61 percent of income from employment for singles males, and 44 percent of income for single females. The comparable figures for single men, single women and couples in the 60 to 64 age group were 35 percent, 25 percent and 39 percent, respectively.

- On average, income from social assistance was only a small source of income for couples, but a substantial income source for both single males and single females, as noted earlier.

- CPP/QPP was a somewhat less important source of income for couples than singles. For example, CPP/QPP was 27 percent of income for single males age 65 to 69, and 24 percent of income for single females age 65 to 69, but only 21 percent of income of couples age 65 to 69.

EXHIBIT 2.2 A

Single Males — Shares of Income by Source for Age Groups, 1995
(Survey of Consumer Finances)

	Under Age 49	Age 50-54	Age 55-59	Age 60-64	Age 65-69	Age 70 and Over
Employment Income	77.2	62.6	61.0	35.2	10.2	2.0
Investment Income	1.3	3.6	5.0	4.6	5.2	10.5
Old Age Security*	0.0	0.0	0.0	2.0	35.4	35.8
CPP/QPP**	1.5	4.3	6.3	17.8	26.8	25.3
Employment Insurance Benefit	4.2	4.4	2.5	4.0	0.3	0.0
Other Gov't Income	4.3	4.4	3.6	7.0	3.9	3.3
Private Retirement Pensions***	0.4	2.6	7.4	11.9	16.4	19.9
Child Tax Credit	0.0	0.0	0.0	0.0	0.0	0.0
Social Assistance	9.5	16.6	11.3	16.3	1.5	0.9
Other Money Income	1.8	1.6	3.0	1.4	0.3	2.2

*Includes the basic OAS benefit, the Guaranteed Income Supplement (GIS), and the Spouses Allowance (SPA). Spouses of OAS/GIS recipients, or single survivors between the ages of 60 and 64 may be eligible for the income-tested SPA benefit.

**The first year of receipt of a discounted CPP/QPP retirement pension would be age 60, the pension being reduced by 1/2 percent per month below the normal age of retirement of age 65. It would be increased by 1/2 percent per month between age 65 to 70 for a delayed CPP/QPP pension. Also before the age of 65, some portion of CPP benefits would be accounted for by CPP disability and survivor benefits.

***Private retirement pensions comprise RPP and RRSP income.

As will be shown in the next section, the tendency for employment is strong in older populations, even among those who have retired by the typical definition — of being in receipt of retirement incomes.

EXHIBIT 2.2B

Single Females — Shares of Income by Source for Age Groups, 1995
(Survey of Consumer Finances)

	Under Age 49	Age 50-54	Age 55-59	Age 60-64	Age 65-69	Age 70 and Over
Employment Income	79.2	61.7	44.1	24.6	4.2	0.6
Investment Income	1.1	3.9	4.6	6.0	8.5	11.2
Old Age Security*	0.0	0.0	0.0	5.8	41.2	47.4
CPP/QPP**	0.8	4.5	10.3	23.1	24.1	21.3
Employment Insurance Benefit	2.5	2.3	1.8	1.9	0.1	0.0
Other Gov't Income	5.2	4.5	6.1	7.2	3.2	3.4
Private Retirement Pensions	0.5	3.1	10.0	13.0	13.3	12.9
Child Tax Credit	0.04	0.1	0.0	0.0	0.0	0.0
Social Assistance	7.8	18.4	19.6	15.6	2.2	2.0
Other Money Income	2.9	1.8	3.4	2.8	3.1	1.3

Notes * and ** same as for Exhibit 2.2A.

EXHIBIT 2.2C

Persons in Couples — Shares of Income by Source for Age Groups, 1995
(Survey of Consumer Finances)

	Under Age 49	Age 50-54	Age 55-59	Age 60-64	Age 65-69	Age 70 and Over
Employment Income	84.7	80.6	67.8	38.5	8.6	1.9
Investment Income	2.6	5.3	8.8	10.0	8.3	11.6
Old Age Security*	0.0	0.0	0.0	6.7	38.8	43.0
CPP/QPP**	0.6	1.8	3.5	18.6	21.0	20.9
Employment Insurance Benefit	3.9	3.1	3.1	2.1	0.5	0.0
Other Gov't Income	2.4	2.4	2.8	3.8	1.8	2.8
Private Retirement Pensions	0.2	1.9	8.0	13.2	17.1	16.7
Child Tax Credit	4.1	0.9	0.3	0.04	0.04	0.0
Social Assistance	0.3	2.3	3.5	4.5	1.4	1.0
Other Money Income	1.2	1.8	2.2	2.5	2.5	2.3

Notes * and ** same as for Exhibit 2.2A. Couples are defined as being both in the age group in question.

Changes in the Utilization of Public-Private Pensions and Other Income Sources Between 1989 and 1995

As can be seen in Exhibits 2.2D, 2.2E and 2.2F below, Survey of Consumer Finances data indicated modest changes in sources of retirement income in the period 1989-95.

Analysis of the key income sources over the entire period indicates:

- employment income was most important for those aged 60 to 64;
- OAS/GIS was most important for those aged 65 and older;
- the third most important sources of income was variously CPP/QPP, private pensions and investment income;
- single males generally derived more income from CPP/QPP and private pensions, while single females were more likely to rely on OAS/GIS.

Key changes occurring between 1989 and 1995 for most groups appeared to be:

- an overall decline in the importance of employment income, likely as a result of changes in the economy (a slower economy, declining employment opportunities, etc.), rather than in retirement system features;
- a substantial decline in investment income, perhaps resulting from declining interest rates in the period 1989-95;
- a decline in the role of OAS/GIS and an increase in the proportion of incomes derived from CPP/QPP and private pensions.

Among those 65 and older, changes over the 1989 to 1995 period are noted that might be more clearly attributed to changes in retirement behaviour and the retirement system:

- CPP/QPP increased as an important source of income. For example, among single women (men) age 65 to 69, CPP/QPP increased from about 18 percent to 24 percent (men: 22 percent to 27 percent) of income between 1989 and 1995. For single women (men) ages 70 and over, CPP\QPP increased from about 12 percent to 21 percent (men: 19 percent to 25 percent) of income between 1989 and 1995. Similar changes were noted for couples. Some of these changes may simply reflect maturation of CPP/QPP.
- Private retirement pension incomes increased 3 to 6 percentage points as a source of income for single females and couples over 65 and single men over 70. These proportions declined very slightly (just over 1 percentage point) for single men, ages 65 to 69, and decreased about 4 percentage points for men in the age group, 60 to 64. For single women, and couples, age 60 to 64, this share declined less than 1 percentage point.

EXHIBIT 2.2D

Changes in Utilization of Public-Private Pensions and Other Income Sources Between 1989 and 1995, Age 60-64

	Single Men		Single Women		Couples	
Income Source	**1989**	**1995**	**1989**	**1995**	**1989**	**1995**
Employment Income	29.3	35.2	25.0	24.6	41.5	38.5
CPP/QPP	16.1	17.8	16.8	23.1	13.1	18.6
OAS/GIS/SPA	4.5	2.0	7.2	5.8	9.5	6.7
Private Pensions**	16.0	11.9	13.7	13.0	12.9	13.2
Investments	8.4	4.6	14.3	6.0	14.1	10.0
Other*	25.7	28.6	23.4	27.5	8.7	12.8

EXHIBIT 2.2E

Changes in Utilization of Public-Private Pensions and Other Income Sources Between 1989 and 1995, Age 65-69

	Single Men		Single Women		Couples	
Income Source	**1989**	**1995**	**1989**	**1995**	**1989**	**1995**
Employment Income	8.8	10.2	4.7	4.2	9.3	8.6
CPP/QPP	21.9	26.8	18.4	24.1	17.5	21.0
OAS/GIS	34.6	35.4	42.6	41.2	39.9	38.8
Private Pensions**	17.7	16.4	11.0	13.3	13.5	17.1
Investments	10.6	5.2	16.5	8.5	14.6	8.3
Other*	6.5	6.1	6.8	8.7	5.2	6.2

EXHIBIT 2.2F

Changes in Utilization of Public-Private Pensions and Other Income Sources Between 1989 and 1995, Age 70 and Over

	Single Men		Single Women		Couples	
Income Source	**1989**	**1995**	**1989**	**1995**	**1989**	**1995**
Employment Income	2.3	2.0	1.0	0.6	1.4	1.9
CPP/QPP	18.6	25.3	12.4	21.1	15.6	21.0
OAS/GIS	34.6	35.8	53.2	47.4	48.9	43.0
Private Pensions**	13.5	19.9	8.8	12.9	10.6	16.7
Investments	20.3	10.5	17.6	11.2	18.4	11.6
Other*	10.7	6.5	7.2	6.6	5.0	6.0

* Includes capital gains, social assistance and other government and private income.
**Private retirement pensions comprise RPP and RRSP income.

2.3 Employment After Retirement

The issue of employment after retirement was examined in more detail using Survey of Consumer Finances data for 1995, and focusing on the sub-group of individuals who were considered to be retired by virtue of receiving one or more types of retirement income — private pension income (RPPs, RRSPs), OAS or CPP/QPP. As seen in Exhibit 2.3, the tendency to work following retirement was substantial in 1995. Overall, 43 percent of male and 35 percent of female retirees in the 55 to 59 age group were still working after retirement. This pattern continued, with only a gradual withdrawal from the work force as key retirement age points were passed. In the case of males, for example, the proportion working declines gradually to 32 percent for retirees ages 60 to 64, and to 24 percent for those age 65 to 69. Even those over 70 continued to work, with nearly 8 percent of retired males over 70 still receiving employment income.

A similar pattern was observed for women, although with a lower rate of participation in employment. Female retirees age 55 to 59 were about 3/4 as likely to work as their male counterparts (a rate mirroring somewhat male-female labour force participation overall). This participation in post-retirement employment for women fell further behind male participation among older groups, with women retirees age 60 to 64 only about 2/3 as likely as males to work (about 21 percent working), with women retirees age 65 to 69 less than 1/2 as likely to work as their male counterparts (about 12 percent working), and with women retirees age 70 and over only about 1/3 as likely as their male counterparts to continue working (2 percent working).

EXHIBIT 2.3

Work in Retirement, Percentage of Retired Persons Still Receiving Employment Income after Retirement, 1995

Age group	Males	Females
55-59	42.9%	34.5%
60-64	32.3	20.6
65-69	23.9	11.6
70 and over	7.6	2.3

Tabulations by SPR Associates from the micro-data files for the Survey of Consumer finances.

Because of the importance of continued employment to understanding the retirement decision, more detailed breakdowns were examined to illustrate the propensity of males and females to continue employment after retirement. These are shown in Exhibits 2.4A and 2.4B. These analyses consider such factors as family type, tenure, education and province as factors which encourage, facilitate or hinder work following retirement.

Data for male retirees show that work is widespread among all demographic sub-groups, with the proviso that work generally declines substantially with age (few workers in the group age 70 and over). For example, among retirees age 55 to 64[14] at least 25 percent of individuals in all family types reported working. However, males in husband-wife families were more likely to work — about 30 to 35 percent of these individuals were employed (suggesting that stability of family life is a predictor of post-retirement employment). Among those ages 55 to 64, those who owned their homes were more likely to work (38 percent) compared to those who rented (24 percent). Similarly those with more education were more likely to work after retirement. Among those 55 to 64 with grade 8 or less, only 19 percent were employed, as compared with 48 percent of those with university degrees. Education was also a major factor in employment in the very late years of retirement with 14 percent of university-educated male retirees working after age 70. Anglophone men were also more likely to be working than others. Across Canada, men in PEI and the Prairie provinces were more likely to be working at older ages.

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[14] In this analysis, the age groups 55-59 and 60-64 were combined, because of small samples in each sub-group.

Results for female retirees were somewhat different, with retired females somewhat less likely to be engaged in employment compared with males. For the age group 55 to 64, a higher proportion of retired women were working in certain family situations, for example, those in husband-wife families with a single child had the highest tendency to be working (33 percent); however, high working rates were also noted for those in lone-parent families (27 percent), and unattached individuals (26 percent). Like males, females ages 55 to 64, who owned their homes were more likely to work than those who rented. Similar to males, females with more education were more likely to work after retirement. This was not evident among older retirees, however, because females over age 65 with university education were not as likely to work as their male counterparts. Female English speakers and speakers of other languages were both more likely to be working in retirement than were those speaking French as their first language.

A partial statistical analysis of the determinants of planned and actual retirement decisions is provided in Chapter 5.

2.4 Other Features of the Retired Population

We also examined some subjective aspects of retirement reported in the GSS.

Well-Being and Retirement[35]

Some aspects of well-being in retirement were also examined, particularly for those who were employed after retirement and for those with and without private pensions to supplement government pensions. This analysis focused on a number of questions in the GSS which examine retirees' feelings that finances have improved or declined since retirement, and whether they are enjoying life more or less since retirement.

Some of these data suggest that those who work after retirement are likely to "enjoy life more" (self reports), and to be in better health. For example, among retired persons, those with private pensions and not working were more likely to report being in good or excellent health (46 percent) than were those not working and without private pensions (39 percent). Employment after retirement was correlated with reports of "financial situation improved" (37 percent among those employed versus 23 percent among those not employed). "Enjoying life more since retirement" was far more likely to be reported by those with private pensions and not working (52 percent) as compared to those without private pensions and not working (41 percent). Those reporting they enjoyed life the most were those who had both private pensions and work (65 percent).

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[35] Tabulations by SPR Associates from the micro-data files for the GSS.

2.5 Implications for the Analysis

The background information presented in this chapter highlights a number of important considerations, many of which are indicated in other studies and reports, and discussed in the literature review in Chapter 3. Some points of particular interest are:

- that pension systems have very different impacts on males and females, reflecting to a great extent differences in-work experience and relative life-long incomes; that pension incomes differ accordingly, generally with smaller pension incomes for females, and also greater reliance among females on OAS;

- that pension incomes are of greater importance at different ages, particularly around the key retirement ages of 55, 60 and 65; this feature of pension incentives is looked at more closely in Chapters 3 and 4 of this report, where issues in pension accruals or pension wealth accumulations are considered. Females experience much smaller reliance on employment income than males after the age of 65, which may reflect fewer opportunities for employment of females for various reasons (e.g., educational attainment, being engaged as caregivers);

- as a result, the adequacy of pension incomes may vary greatly for those who are in different pension situations, and in different age groups;

- employment after retirement has become increasingly common (43 percent of retired males and 35 percent of retired females in the age group 55 to 59 were working, according to the 1995 Survey of Consumer Finances), and this points to increasing difficulties in the definition of retirement;

- those who are retired show life satisfaction and health status which varies substantially with the types of pension received (for example, if receiving private pensions in addition to public pensions), and with employment status. This points to the importance of examining the retirement decision in the broader context of the life-cycle, and psychology and motivations of individuals.

A number of these types of issues reappear in the report, for example, in examining the literature on the retirement decision (Chapter 3), in the simulations of pension plan incentives (Chapter 4), and in the statistical analysis of the determinants of individuals' plans for retirement (Chapter 5).

A proposed analysis of pre-retirement income replacement through public and private pensions in retirement was not carried out, however, because of the complexities of melding the impacts of public and private pensions on income replacement in a simulation model.[36]

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[36] One model, the HRDC Modular Analysis Package for Systems of Income Transfer (MAPSIT) which was used in past CPP and OAS evaluations to estimate pre-retirement gross and net income replacement effects through public pensions, does not have as part of its system a fully articulated set of parameter values for private (defined-benefit RPP) pension-type programs. This would have represented a significant modelling effort for this purpose, especially with regard to detailed information on the employer pension plans of "hypothetical" individuals, and a diversion of resources form the main goal of the study, namely the measurement of more incentive-related aspects of pensions by way of pension wealth accruals (Chapter 3). Gunderson, Pesando and Hyatt (1996) estimated gross income replacement rates from public pensions of 130 percent for persons whose pre-retirement earnings is one-quarter of the average industrial wage, 71 percent for earnings at half the average wage, 42 percent for persons at the average wage, 21 percent for persons at twice the average wage, and 8 percent for persons at five times the average wage

EXHIBIT 2.4A

Percentage Employed, Among Male Retirees by Demographic Characteristics, 1995

	Age 55-64	Age 65-69	Age 70 and over
Family Type			
Unattached Individual	27.0	14.0	2.9
Husband-wife Only	29.9	19.1	6.1
Husband-wife family with single child(ren) only	35.3	17.3	7.7
Other husband-wife families	26.2	16.9	1.5
Lone-parent family with single child(ren)	28.2	14.3	6.4
Tenure			
Home ownership	38.0	27.0	3.6
Owned without mortgage	29.2	17.0	5.5
Rented	24.4	13.5	2.3
Highest education level			
No schooling or grade 8 or lower, no other education	18.7	10.9	3.4
Grade 11 – 13, graduated from high school	38.5	20.4	3.5
Post-secondary certificate or diploma	30.3	22.9	5.6
University degree	48.3	25.7	14.4
Mother tongue			
English	33.2	18.9	4.4
French	24.1	14.4	3.5
Other	28.3	17.5	5.7
Type of household (living arrangements)			
Living alone	26.5	13.1	2.7
Living only with other unattached indi.	37.2	31.7	7.2
Family member, no unrelated persons	30.4	18.2	5.3
Province			
Newfoundland	19.8	3.6	2.7
Prince Edward Island	35.6	16.0	5.7
Nova Scotia	21.4	15.3	3.4
New Brunswick	21.5	10.0	3.3
Quebec	24.6	14.5	3.9
Ontario	33.5	18.2	4.4
Manitoba	33.0	19.2	7.1
Saskatchewan	47.1	26.2	8.4
Alberta	29.1	23.0	7.6
British Columbia	32.1	18.9	2.6

Tabulations by SPR Associates from the micro-data files for the Survey of Consumer Finances

EXHIBIT 2.4B

Percentage Employed, Among Female Retirees by Demographic Characteristics, 1995

	Age 55-64	Age 65-69	Age 70 and over
Family Type			
Unattached Individual	26.4	10.8	1.9
Husband-wife Only	19.9	12.4	2.8
Husband-wife family with single child(ren) only	33.1	8.3	8.1
Other husband-wife families	19.6	2.0	0.4
Lone-parent family with single child(ren)	27.1	14.5	7.2
Tenure			
Home ownership	35.2	16.8	1.6
Owned without mortgage	22.5	11.0	3.0
Rented	19.2	10.8	1.3
Highest education level			
No schooling or grade 8 or lower, no other education	13.1	5.3	2.0
Grade 11 — 13, graduated from high school	31.5	17.0	2.5
Post-secondary certificate or diploma	27.0	17.8	4.1
University degree	40.7	18.4	4.1
Mother tongue			
English	25.8	13.4	2.6
French	20.0	7.6	1.9
Other	24.4	12.5	2.3
Type of household (living arrangements)			
Living alone	25.6	10.7	1.7
Living only with other unattached indi.	42.1	15.8	7.2
Family member, no unrelated persons	22.8	12.0	2.7
Province			
Newfoundland	10.6	0.0	1.5
Prince Edward Island	31.2	3.4	3.5
Nova Scotia	15.8	6.7	2.2
New Brunswick	14.7	6.7	1.6
Quebec	20.7	8.1	1.7
Ontario	27.9	14.9	2.8
Manitoba	32.3	13.0	2.9
Saskatchewan	34.2	10.4	3.9
Alberta	19.7	15.6	4.2
British Columbia	23.4	11.3	1.1

Tabulations by SPR Associates from the micro-data files for the Survey of Consumer Finances

3. *Lessons from the Literature and Data Review*[37]

The existing literature on the determinants of the retirement decision can best be analysed in terms of three dimensions: theoretical issues, empirical evidence, and data availability.

3.1 Theoretical Issues

A theoretical framework for analysing the determinants of the retirement decision should serve a variety of purposes. First and foremost, it should provide a comprehensive list of the determinants of the retirement decision and indicate their expected effect on that decision. It should also indicate the appropriate functional form or way to enter those determinants (e.g., linear or non-linear, key interactions) as explanatory variables in a multiple regression equation.

In addition, a theoretical framework should highlight how to incorporate other factors, such as life-cycle and family decision-making, as well as institutional features such as mandatory retirement and public and private pensions. It should provide guidance as to the appropriate form of the dependent variable (i.e., the retirement decision), as well as how best to estimate the relationship between that decision and its determinants. Ideally, the theoretical framework will be linked to key policy concepts and issues, so that resultant analyses can be easily linked to policy choices.

Concepts of Retirement

While most studies tend to use one measure of retirement, some use a variety of alternative measures. The following concepts of retirement have been used in the literature:

- Individual's statement of their planned retirement age;
- Self-reported response where the person indicates that they are retired;
- Left the labour force in the sense of no longer working or looking for work;
- Reduced hours of work or pay, sometimes below a specific fraction of a previous norm;
- Left career or main employer, possibly to continue working in another job;
- In receipt of an employer-sponsored pension; and
- In receipt of a public pension.

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[37] See SPR background study by Morley Gunderson, "Literature Review of Public and Private Financial Incentives for Retirement" (2001), for details. The numerous record references which appear in this background study are not repeated in this discussion.

Income-Leisure Choice Framework and Reservation Wages

The theoretical framework that is most often used to analyse the determinants of the retirement decision is the "income-leisure" choice perspective of economics, modified to account for the peculiarities of the retirement decision. That perspective views individuals as choosing between retiring from paid labour market activities (i.e., engaging in leisure activities or household work) and continuing in paid employment (i.e., earning income). That decision essentially involves comparing utility or well-being in the alternative states, subject to various constraints such as those imposed by the individual's wealth and the market wage they can expect to receive.

The decision to retire can also be affected by institutional constraints such as mandatory retirement rules, and the incentive effects of public and private pensions. The retirement decision can also be affected by demand side factors (e.g., labour market conditions and unemployment) that determine whether jobs are available.

An alternative formulation of the decision rule is that the individual will retire if their market wage is below their reservation wage. Their reservation wage is essentially the implied value of their time in non-labour market activities such as retirement. It is higher, for example, if they have higher non-labour market income (e.g., assets, wealth, pension income) from which to enjoy retirement. It is also higher if their health or the nature of their work makes it difficult for them to engage in labour market activities. It is also higher if their family circumstances make retirement more attractive (e.g., if their spouse is retired or not working).

Life-Cycle Dimensions

Another type of theoretical work that builds on the income-leisure choice perspective and reservations wages emphasizes the dynamic life-cycle nature of the retirement decision. The life-cycle models emphasize that the retirement decision is not based simply on an evaluation of the different states at a given point in time. Rather, it is based on a more forward-looking approach that evaluates the expected remaining lifetime well-being associated with the alternative states, including the income streams associated with those states.

Pension Wealth, Pension Capital Changes and Option Values

Changes in pension wealth have been calculated to illustrate this aspect of the incentives that employees could expect to experience if they retired from their particular job. This is often calculated as the difference between the present value of their expected "stay" pension wealth if they were to remain in their job until the age of normal retirement, and the present value of their "quit" pension wealth if they were to leave their job. Pension capital losses can occur because employees who leave their job forgo the wage increases that would otherwise augment their pension wealth.

Option value measures have also been used to provide a measure of the changing value of pension wealth associated with retirement versus continued employment. The option value captures the notion that a person who retires forgoes the opportunity to continue to work and accumulate additional pension benefit accruals from such factors as additional service credits, wage increases, and eligibility for early retirement provisions. Conversely, continuing to work one more year preserves the option of continuing to work another year, and so forth, and of qualifying for such factors as subsidized early retirement provisions. The option value of working an additional year is calculated as the difference in the present value of maximum pension benefits associated with working that year as opposed to retiring.

Public Pension Plan Incentives

Much of the recent literature on the determinants of retirement decisions is of U.S. origin and has focused on the incentive effects of public pensions, notably Social Security in the U.S. Of particular importance is the retirement test which essentially involves reductions or "clawbacks" of pension income for persons above a certain level of earnings who continue to earn income after reaching the age of entitlement for such pension benefits. These likely encourage retirement because they reduce the monetary returns to work. Other features, however, can encourage continued labour force participation, for example, so as to continue making contributions that will enhance subsequent benefits.

The asset or wealth value of public pension plans can have a different impact on the retirement decision than wealth from other sources. Wealth from public pension plans may have an influence on the retirement decision because it cannot be bequeathed to heirs, unlike other forms of wealth which older persons may be reluctant to use up (say, by retiring early) because it can otherwise be passed down as an inheritance. Public pension income may have an effect on the retirement decision because it is received with a high degree of certainty, and often indexed for inflation. However, there are many other determinants of the retirement decision besides public pensions (see chapter 5).

The previous research refers to the effects of U.S. Social Security on the retirement decision. In comparison, *evidence on the impact of public pension plans in Canada is extremely scarce*. Baker and Benjamin (1997a) analyzed the impact of the removal of the old earnings test for those 65 years of age and over (clawback of pension payments if the person began to earn income in the labour market following receipt of the benefit) in the CPP/QPP in the 1970s. Their analysis used the 1972-1980 family files of the Survey of Consumer Finances, conducted every two years. Their results indicated that the removal of the retirement test led to a large and statistically significant increase in weeks worked for those who were employed. Alternatively stated, the clawbacks of the retirement test would have reduced the worktime of persons at that time.

Baker and Benjamin (1997b) also analysed the impact of the early retirement options introduced into the QPP in 1984 and the CPP in 1987. Their analysis was based on the 1972-1980 family files of the Survey of Consumer Finances, conducted every two years.

They found little effect of inducing early retirement in the short run, but that in the longer run (after eight years) the early retirement provisions would have led to a "bunching up" of retirements around those early retirement dates.

Private Employer-Sponsored Occupational Pension Plan Incentives

Significant incentive effects can also be embedded in private, employer-sponsored occupational pension plans. A number of studies have "modelled" or calculated the changes in private pension wealth associated with such factors as the accumulation of age and service credits, early retirement features and postponed retirement features. Such features can give rise to substantial changes in pension wealth in various forms: "backloading" or "deferral" of compensation; spikes in private pension wealth at the ages when early and special retirement features apply; and reductions in pension wealth if individuals postpone retiring past the normal retirement age of their plan. These incentive effects of private occupational pension plans can be an important strategic human resource tool for organizations since, in effect, they alter the compensation profile of individual workers.

In most cases, these studies simply modelled the *potential* incentive effects of the private occupational pension plans by calculating the pension benefit accruals at different ages for persons in representative pension plans. They usually were not able to link these to *actual* retirement decisions because the data sets on actual retirement decisions did not have detailed information on the private occupational pension plans.

Mandatory Retirement

Mandatory retirement is considered to be an institutional rule that can affect — indeed dictate — the retirement decision. Mandatory retirement rules exist as part of company personnel policies or collective agreements, usually as part of employer-sponsored pension plans. They are rules that essentially terminate a particular employment arrangement at a given age.

Mandatory retirement rules may facilitate worksharing by opening job and promotion opportunities for younger workers in the organization. They may facilitate succession planning for the organization and retirement planning and "retirement with dignity" for the individual. They may also facilitate deferred compensation by providing a termination date to implicit or explicit compensation arrangements whereby individuals are "underpaid" (relative to their productivity) when young in return for being "overpaid" when older.

Mandatory retirement policies are now banned in the United States. In Canada, however, the Supreme Court ruled in favour of allowing mandatory retirement policies. Such policies tend (but are not required) to apply at age 65 when normal retirement pension benefits are available.

The theoretically expected impact of a mandatory retirement policy on retirement, however, is not as straightforward as it would initially appear. This is so because when mandatory retirement exists, an employer-sponsored occupational pension plan is invariably present, and the age of mandatory retirement (e.g., 65 years) usually corresponds to the age at which public pension plans become available (e.g., CPP/QPP).[38]

As such, it is extremely difficult, if not impossible, to disentangle the separate impact of mandatory retirement from the effect of public and private pension plans on the retirement decision. People may leave the labour force around the age at which they are subject to mandatory retirement not so much because of mandatory retirement per se, but because of the monetary incentives to retire as embedded in the associated public and private pension plans. But, if mandatory retirement is highly correlated with the onset of public and private pension plans, then it is very difficult to disentangle the effects of pension features from mandatory retirement rules.

Health, Age, Labour Market Conditions and Other Determinants

Ill health likely makes labour market work more difficult and encourages retirement. The retirement inducing effect of ill-health may be particularly strong if individuals also have the income that enables them to afford to retire; that is, health status may interact with other variables to affect the retirement decision.

Labour market conditions, especially the unemployment rate, can affect the retirement decision, albeit in a theoretically indeterminate way. On the one hand, high unemployment may discourage individuals from remaining in the labour market and looking for work. On the other hand, high unemployment may compel others to remain in the labour market to maintain what otherwise may be declining family income associated with the higher unemployment. These are, respectively, the discouraged worker, and added worker effects,[39] that higher unemployment can have on the labour force participation (and hence retirement) decisions.

Periods of high unemployment, downsizing and mass layoffs can particularly affect older workers because they are often more "expensive" workers and may have difficulty adjusting to the restructuring that is often associated with downsizing. If laid off, they may have particular difficulty in finding another job and hence may leave the labour force for retirement.

The composition of jobs and growing wage inequality may also affect retirement decisions. The composition of jobs may be shifting towards ones with typically lower retirement ages. Low wage individuals may not be able to afford to retire, but their lack of viable job opportunities may induce their retirement.

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[38] A discounted CPP/QPP pension can be obtained as early as age 60.

[39] This is the inducement to increased labour force participation by another household member.

3.2 Empirical Evidence

Much past empirical work on the determinants of the retirement decision has largely involved survey studies by the U.S. Social Security Administration, essentially asking people why they retired. The responses typically involved statements about ill-health or employer-initiated layoffs. They emphasized the involuntary nature of retirement, downplaying any notion that retirement may be a voluntarily chosen state, especially in response to increased wealth or incentives embedded in public and private pensions.

Such survey responses may be subject to retrospective or recall bias because the questions are asked of persons who were already retired, often after a considerable period of time. Given their age, retired persons may be in ill health when asked the question, and hence may be prone to respond about their current state rather than the state of their health when they retired. This is further complicated by the fact that involuntary retirement because of ill health may be regarded as more socially acceptable than voluntarily retiring because one can afford to do so, or because features of the public and private pension system reduced the monetary incentive to continue working.

Past studies of the actual retirement decision tended to find that features of the Social Security system induced retirement. Subsequent empirical studies that focused on whether changes in U.S. Social Security wealth could explain the decline in labour force participation tended to find that it was a contributing factor, but its overall effect was often quantitatively small. Studies that focused on the impact of mandatory retirement found that the features of public and private pension systems were more important than mandatory retirement policies in inducing retirement. These tended to reduce the monetary incentive to work around the typical age of mandatory retirement policies.

Studies that modelled more precisely the incentive effects of the various detailed features of U.S. Social Security tended to find that the sharp spikes in public pension wealth that occurred at specific ages when the features applied were associated with sharp spikes in retirement around those ages, as well as with substantial reductions of hours of work for those who did not leave the labour force. Reductions in public pension wealth associated with continued labour force activity past the age of normal retirement also induced retirement.

Similar incentive effects were found to exist in features of private, employer-sponsored, occupational pension plans. Those features generally discouraged quits and turnover because of the substantial "backloading" of pension benefit accruals; that is, the benefits occur later in the employees' careers when pensions are based on age and/or service credits and perhaps earnings in their final years. In those studies, early retirement was found to be induced at the ages when subsidized early and special retirement would apply, and postponed retirement was discouraged by penalties associated with continued employment past the normal retirement age.

Research studies point to many other factors in the retirement decision. Ill health is almost invariably found to encourage retirement. This is especially the case if the individual had sufficient pension or other income to be able to afford to retire. High unemployment rates and adverse labour market conditions also tend to encourage retirement. This suggests a dominance of discouraged worker effect over added worker effect. A small number of empirical studies have also documented that the determinants of retirement tend to be different for women than for men. Specifically, the retirement decision of women tends to be influenced more by their household circumstances, especially by the health of their husband, than by their own economic circumstances.

The empirical evidence also suggests that the dominant form of retirement still tends to be exiting completely from the labour market versus continuing to work. Nevertheless, bridging into phased or partial retirement is common and it is becoming increasingly common in a wide range of forms: reduced hours, part-time work, self-employment, contract work, shifts from a career job to other jobs, and even return to work after retirement.

Based on Canadian data, for example, Monette (1996) documents that 13 percent of retirees returned to paid employment following initial retirement. The likelihood of returning to work was higher amongst younger retirees and those with more education. Most of those who re-entered the labour market did so as part-time employees. Their reasons for returning were varied, and included financial reasons, occupying free time and personal preferences. While the return to work decision is important, and likely growing in importance, the relatively significant numbers that are involved nevertheless suggest that this group merits special analysis, rather than being part of a more general analysis of the retirement decision.

3.3 Data Availability[40]

There is no single Canadian data set that dominates in the sense of providing the detailed information on retirement decisions and the determinants of those decisions, especially with regards to the features of public and private pension plans. None of the data sets provide all of that information.

But most of the data sets contain information that would enable calculating expected public pension benefits. Some have information that would enable determining the existence of an employer pension plan; however, none have information on the types of plans, and especially their inherent characteristics. In some cases, this could be deduced only very imperfectly (poorly) from other indirect information, such as the existence of a collective agreement (which would suggest a flat benefit plan) or the industry or occupation of the individual (which would enable linking the plan to the typical pension plan in that industry or occupation, from other data). This approach, however, would not provide critical information on the important features of employer pensions like early and special retirement, integration with CPP, the benefit calculation method, indexing provisions, etc. Such information on employer plans does not seem to be available through any of the data sets.

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[40] See SPR background study by Morley Gunderson "Literature Review of Public and Private Financial Incentives for Retirement" which includes a review of past U.S. data-gathering exercises for this purpose. The latter notes the extreme difficulties encountered in such data collection exercises.

3.4 Simulation Models

DYNACAN and MAPSIT

Simulation models like DYNACAN and MAPSIT are not currently designed for, nor suited to, the purpose of estimating the determinants of the retirement decision. Also, they are not designed for incorporating the incentive effects of public and private pension plans. In the future they might be adapted for this purpose, however.

DYNACAN — which is being developed by the Office of the Superintendent of Financial Institutions — is a longitudinal, dynamic microsimulation model designed to simulate aggregate effects related to the CPP/QPP. It can be used, for example, to simulate the aggregate financial impact on individuals and families of policy changes in the CPP/QPP. The procedure essentially involves simulating the impact of the policy change by running the system with the policy change in place and comparing the results to those of the baseline case without the policy change.

MAPSIT (the Modular Analysis Package for Systems of Income Transfers) of Social Policy Branch (Strategic Policy), HRDC, is a software system designed to simulate and present the effect of changes in tax-transfer programs. It is a macro model which combines the effects of multiple programs in the tax-transfer system. It incorporates marginal tax rates and eligibility requirements for major public programs (e.g., OAS, GIS, CPP, the Child Tax Credit).

Neither DYNACAN nor the MAPSIT system contains information at this time on the parameter values of the behavioural determinants of the retirement decision.

Pesando, Gunderson and Hyatt Model

Pesando, Gunderson and Hyatt[41] developed a model to estimate private pension wealth (RPP) accrual effects at different ages by using essentially present value calculations of private pension wealth accumulation effects. These are based on assumptions about lifetime earnings, contributions to pension plans and their program rules or characteristics, early or special retirement incentive effects, the demographic characteristics of the households being modelled (e.g., ages of workers and their spouses, the life expectancies of workers), and assumptions about the discount rates employed in these calculations.

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[41] See J. Pesando, M. Gunderson and J.D. Hyatt "Early Retirement Pensions and Employee Turnover," *Research in Labour Economics*, volume 13, 34-337, 1992, and J. Pesando and M. Gunderson "Retirement Incentives Contained in Occupational Pension Plans and their Implications for the Mandatory Retirement Debate" *Canadian Journal of Economics*, volume XXI, No. 2, May, 1988.

The Gruber Model

The model developed by Gruber[42] was designed only to estimate public pension wealth accumulation effects at different ages. It employs the present value approach combined with expected life expectancies for illustrative workers and their households with various socio-economic characteristics. These are based on assumptions about lifetime earnings, contributions to the CPP/QPP, public pension program characteristics, the demographic characteristics of the households being modelled, and assumptions about the discount rates employed in these calculations.

The Selected Approach

The analysis of the pension wealth accruals effects which follows is carried out by melding two modelling approaches: that of Gruber (1997) for the public pension incentive effects, and that of Pesando, Gunderson and Hyatt (1992) for the private pension incentive effects. A two-part empirical analysis was carried out based on what is perceived to be the best data set for calculating the potential incentive effects of public and private pension plans (the Survey of Consumer Finances), and the best data set for estimating the determinants of the retirement decision (the GSS, Cycle 9).

The two parts of the analysis could not be directly combined because the data sets that enable estimating the determinants of the retirement decision do not include measures of the nature of the individual's employer pension plan. Therefore details on employer pension plans could not be incorporated into the simulated pension benefit accruals. While the two parts cannot be directly combined, indirect comparisons can be made. For example, simulations of the changes in pension wealth can be used as possible explanations of retirement patterns that may emerge from the analysis of the determinants of the retirement decision.

The analysis applies to a necessarily simplified set of base cases which may not be typical. In particular, the assumption is made of a continuous work history at the median wage with no interruptions, of a male, with a spouse who never worked. In respect of private pensions, the focus is on workers who have defined-benefit RPPs of varying types (less than half the workforce).

3.5 Summary Observations

The existing theoretical and empirical literature on the determinants of retirement highlights that retirement decisions generally respond to market incentives, such as the persons expected wage and job opportunities as well as pension benefits from public and private plans. As well, they are sensitive to individual circumstances, especially their health and wealth (and ability to afford to retire).

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[42] See J. Gruber "Interaction of Public Pensions and Retirement Decisions in Canada", Massachusetts Institute of Technology, 1998.

But the existing data have weaknesses, in part because all of the determinants of retirement are not available in a single data set. In particular, it is generally very difficult to incorporate the features of public and especially employer pension plans into data sets that have other determinants of retirement. The weakness is particularly pronounced with respect to employer plans, especially because they have a wide range of features that are designed specifically to influence retirement decisions.

As seen in the next chapter, important variations may be found in the way incentive efforts of public and private pensions affect the retirement decision.

4. Estimations of Incentive Effects of Private and Public Pensions[43]

Chapters 4 and 5 address the evaluation question: *"What are incentives and disincentives for older workers to retire arising from combinations of public and private retirement benefits in order to maximize these pension benefits?" This analysis also examines the related question: "How important are these effects in the retirement decisions of workers vis-a-vis other determinants of retirement?"*

In the demographic circumstances of the 1990s and beyond, there may be increased pressure for public policy initiatives to encourage early retirement as a form of worksharing, especially to open job and promotion opportunities for younger workers. Early retirement is also often regarded as a viable adjunct to downsizing. This is especially so if downsizing is done through voluntary incentives. As issues of eldercare become more prominent in the future, especially associated with the aging population and the shift from institutional to community and family-oriented health care, retirement may be regarded as an important component of facilitating such family-based care. For example, some people may retire or might wish to retire to care for older family members in fragile health.

Pressures on public policy may also work in the other direction to reduce the financial incentives towards early retirement, and especially to reduce unintended incentives that may discourage older persons from continuing to work if they so choose. Older workers are often regarded as an important pool for filling possible impending labour shortages, especially if their preferences for part-time retirement mesh with the needs of employers for a flexible work force. Improvements in health and life expectancy, and shifts to less onerous, white-collar jobs, also means that individuals may be able to continue working past the (historic) age of usual retirement of 65.

As well, with population aging and longer life expectancy, increased pressures on seniors' public pension programs, including the CPP/QPP, may give rise to pressure to facilitate continued employment in order to reduce financial demands on such systems.

Clearly, pressure on public policy may be in the direction of encouraging early retirement or in the opposite direction of facilitating continued labour market employment of older persons. In either circumstance, it is important to understand the financial incentives that are embedded in public and private pension plans and how these incentives may affect the retirement decisions.

The purpose of the following analysis is to illustrate such financial incentives as they exist in representative defined-benefit employer-sponsored pension plans, the most important category of pension plans in Canada,[44] and to show how they combine with public plans like CPP/QPP and OAS/GIS/SPA. Particular attention is paid to the institutional features of such employer-sponsored plans, including early and special retirement features and integration features with the CPP/QPP.

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[43] See SPR background study by Morley Gunderson and Douglas Hyatt "Simulations of Incentive Effects of Private and Public Pensions" (2001), for further details.

The financial features of employer-sponsored pensions are illustrated through simulation models adapted from earlier studies by Pesando, Gunderson and Hyatt.[45] The financial incentives of such private pensions are then integrated with the financial incentives of the public plans based on the simulations as presented in Gruber (1997). The same assumptions about socio-economic households characteristics were used in this analysis as were used by Gruber for the public plans. As already noted, while the analysis applies to a necessarily simplified set of base cases it is nevertheless illustrative of such potential effects.

The public plans include the employment based CPP/QPP, the universal OAS, the means-tested GIS and SPA.[46]

4.1 The Estimation Model

4.1.1 Pension Wealth Accruals

The estimation model essentially involves calculating the present value of the changes in expected pension wealth accruals associated with each year of employment for representative employees at different ages. This is expressed as a percent of the employee's wage or annual earnings in each year. The wage is assumed to be constant throughout the working life. Pension wealth in a given year is the discounted present value of the stream of pension payments[47] to which the employee would be entitled if the employee retired and left the plan at the end of that year. The change in pension wealth, or pension benefit accrual in that year, is the change in that wealth if the employee remains in the plan for that year. An annual pension wealth accrual of 20 percent of an employee's wage at age 59, for example, would mean that if the employee worked and remained in the plan until the age of 60, the increased value of their pension wealth would be the equivalent of 20 percent of their wage for that year.

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[44] Of the 42 percent of the labour force and of paid workers belonging to a Registered Private Pension (RPP) in 1995, 88 percent belonged to defined-benefit plans (see Statistics Canada, *Pension Plans in Canada*, January 1, 1996, p. 19, p. 35).

[45] Pesando and Gunderson (1988, 1991) and Pesando, Hyatt and Gunderson (1992).

[46] The Canada Pension Plan is a federal/provincial/territorial public pension plan, established in 1966 as a compulsory and contributory social insurance program. It is funded largely on a pay-as-you-go basis. It provides contributors and their families with a basic level of protection against the loss of earnings due to retirement, disability, or death of the contributor to the plan. All employed Canadians, who are 18 years of age and over and have minimum earnings, contribute to the CPP/QPP. In return, they are guaranteed a pension at retirement.

The Old Age Security Program provides basic income security to Canadian citizens and residents who meet age and residency requirements. Currently, there are three benefits payable under the *Old Age Security Act* — the basic OAS pension, as well as the non-taxable, income-tested Guaranteed Income Supplement (GIS) and the Spouses Allowance (SPA) components of the OAS. The basic OAS pension is available to all applicants who are 65 years of age and over and who meet the Canadian residence requirements. The Guaranteed Income Supplement (GIS) is an income support component of the Old Age Security Program which is income-tested but not taxable.

The Spouses Allowance (SPA) is an income-tested, non-taxable allowance available to Old Age Security pensioner's spouses, who are 60 to 64 years of age, and to widows and widowers age 60 to 64, who have lived in Canada (or a country with which Canada has a reciprocal pension agreement).

[47] The pension benefits are assumed to last for the worker's remaining life expectancy, as given in *Statistics Canada Life Tables, Canada and Provinces*, No. 84-537, 1995.

Clearly, such changes in pension wealth can have important incentive effects on the retirement decision — augmenting those that exist from wages themselves. This is especially the case when, as illustrated below, large spikes or discontinuities in year-over-year pension wealth accruals are associated with institutional features of such plans, including early and special retirement.

4.1.2 Three Representative Types of Private Plans

To illustrate the financial incentives or disincentives embodied in employer-sponsored private plans, three representative types of final-earnings defined-benefit plans are considered. Each of these plans has its own set of key features so that successive comparisons of the pension wealth accruals associated with each type of plan can be used to illustrate the potential effects of the financial incentives arising from these features. While the pension plan features are representative, they do not necessarily exist in all pension plans.

Basic Plan

The first representative plan is a defined-benefit RPP.[48] In this plan, the normal retirement pension benefit formula is 2 percent of final (three-year) average earnings for each year of service up to a maximum of 35 years of service. The pension payment commences at the normal retirement age of 65. For example, if the employee had 35 years of service and they retired at the age of 65, their employer pension would be 70 percent of their final, three-year average earnings. Additional features are described below:

- Reflecting the recent legislative requirements in Canada, the plan vests after two years of service; that is, the person has a right to both their own contribution and that of their employer after two years of service.

- The plan is integrated with the CPP/QPP, in that there is an offset or reduction in employer pensions associated with the receipt of CPP/QPP. That offset in this plan is 0.6 percent of earnings up to the Year's Maximum Pensionable Earnings (YMPE) as established by the CPP; that is, the benefit formula is 1.4 percent of earnings up to YMPE and 2 percent of earnings in excess of YMPE. This integration occurs at age 65, upon receipt of normal CPP/QPP. (The possibility of its being offset by a possible bridging supplement and the age of early retirement is discussed below.)

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[48] A defined-benefit RPP is one where the benefit formula is specified in advance. It is to be contrasted with the defined-contribution type of RPP, where only the contribution formula is defined and benefits are defined by their investment return.

- Unsubsidized early retirement is available at age 55 or beyond, with at least 10 years of service; that is, there is an actuarially fair reduction of benefits designed to reduce the annual benefits to exactly compensate for the fact that they are received sooner and for a longer period of time.

- The Basic Plan does not have *subsidized early retirement or special retirement.*

- As with all other plans, the benefit accruals under the basic plan are calculated with and without CPP bridging supplements. Bridging supplements effectively waive the integration offset for persons who take early retirement (as early as 55) in advance of receiving the CPP/QPP at age 65. This means that if the employee retires under an early or special retirement feature, the benefit is calculated as a flat 2 percent of final earnings (not 1.4 percent) until the age of 65, thereby compensating for the typical offset of 0.6 percent as discussed above, on earnings up to YMPE. Thereafter, when the employee is in receipt of regular CPP/QPP at age 65, the integration offset applies. In effect, the bridging supplement is a bonus to early retirement.

- With respect to postponed retirement, if the employee works beyond the age of 65, they can no longer accrue additional pension credits, but the pension that is normally payable at age 65 is actuarially increased at the time the employee does retire and commences to receive their delayed pension. The actuarial adjustment is "fair" in that it is designed to exactly compensate for the fact that the pension is received later and for a shorter expected period of time.

Subsidized Early Retirement Plan

The subsidized early retirement plan is the same as the basic plan except that an early retirement benefit is available. This benefit which is available to employees at age 55 and with at least 10 years of service, is reduced by 5 percent per year for each year of age that early retirement precedes normal retirement at 65. This involves a subsidy because the reduction in the early retirement benefit is less than the actuarially fair reduction that would reduce the annual benefits to exactly compensate for the fact that they are received sooner and for a longer period of time as a result of early retirement.

Subsidized Early and Special Retirement Plan

The subsidized early and special retirement plan is the same as the subsidized early retirement plan, except that a special retirement feature is also available when the employee attains the age of 60 with at least 20 years of service. Special retirement essentially involves a larger subsidy, in that there is no reduction in annual benefits (i.e., the reduction formula is zero) to compensate for the fact that they are received earlier (at age 60) and for a longer period of time.

4.1.3 Format of Results

For each of the three plans, we show the pension benefit accruals expressed as a percent of annual wages. These results are discussed separately (Section 4.2) for when a CPP/QPP bridging supplement is provided (the integration offset waived if

the employee retires between the ages of 55 to 65) and when a bridging supplement is not provided (the integration feature applies). As indicated previously, the bridging supplement applies at the age of early or special retirement and continues until the receipt of normal CPP/QPP at age 65. The calculations are provided for each age between 55 and 69, since these are the ages that encompass the main institutional features such as early, special, normal and postponed retirement, as well as the integration features and bridging supplements.

For each of these six calculations (i.e., three defined-benefit plans with and without bridging supplements), the public pension benefits (OAS/GIS/SPA and CPP/QPP) are then integrated to estimate total private and public pension wealth accruals.

The assumptions used in this analysis include a real discount rate of 3 percent[49] and the "Base Case" scenario, which is a median-wage[50] male born in 1930 who commenced working in the organization at the age of 30 and whose wife was three years younger and never worked. The man is assumed to have worked continuously at the median wage and would have worked 35 years if he worked until age 65. The man and wife are also assumed to have normal life expectancies.[51] Age 65 corresponds to the year 1995. CPP and private pension contributions occur from age 30 onwards.

The analysis included calculations of private pension benefit wealth accruals (using each of the three defined-benefit plans, with and without bridging supplements), as well as private and public accruals, for the median wage household as well as for the same household-type for employees whose wages are at the bottom 10th percentile[52] and at 1.5 and 2.0 times the base-case median wage. The pension wealth accruals, and hence the financial incentives for retirement, are affected separately by each of the changes (e.g., subsidized early retirement, special retirement, bridging supplements, public pensions) for persons of different wage levels.

As already noted while the analysis applies to a necessarily simplified set of base cases it is nevertheless illustrative of such potential effects. In particular, the assumption is made of a continuous work history at the median wage with no interruptions, of a male, with a spouse who never worked.[53] In respect of private pensions, the focus is on workers who have defined-benefit RPPs of varying types (less than half the workforce).

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[49] This is the rate of return that would correspond to the real return on long term (30 years) risk-free investment assets like Government of Canada bonds. This rate was also used in the Gruber study.

[50] This is the median wage as used by Gruber and is similar to the average wage. Specifically, the median annual earnings in 1995 was $37,022 for males based on the *Survey of Consumer Finances (Statistics Canada Earnings of Men and Women*. No. 13-217 XPB,1995). This exceeded the Year's Maximum Pensionable Earnings under CPP of $34,136 in 1995. It is also noted that the average annual earnings in 1995 was $40,610 for males based on the same survey.

[51] Life expectancy estimates are based on Statistics Canada *Life Tables*, No. 84-537, 1995.

[52] The bottom tenth percentile is used to demonstrate the effect of extreme dependence of the household on the means-tested GIS and SPA benefits.

[53] The base case worker has not availed himself of the CPP general drop-out privilege for low earnings years or non-employed years. (a maximum of 15 percent of working years between the ages of 18 and 65 after 1966 when the CPP came into effect) Such workers only represented 10 to 16 percent of workers born in 1930.

A Caveat Regarding Financial Incentives Created by Pension Wealth Accruals

The extent to which pension wealth accruals create an incentive to retire or to continue working is not only determined by the accruals themselves (assuming they are known by the worker). The retirement decision also depends upon the disutility of continued employment or the reservation wage associated with continued employment. That disutility is likely to increase with age, especially if health deteriorates, work becomes more onerous, one's spouse retires, and one accumulates more assets. As such, large and increasing pension wealth accruals may be necessary to provide the financial incentives to continue working and offset the increased disutility of work, especially if wage growth also declines with older age.

4.2 Estimation Results: Private Employer Plans

4.2.1 Median Earnings Household

Basic Plan

Exhibit 4.1 indicates that, in the basic type of employer pension plan, pension benefit annual accruals[54] increase smoothly from 13 percent of wages at age 55 to 28 percent of wages at age 65, and then drop abruptly to zero after age 65, when the maximum years of pensionable service occurs. Notable features of those accruals include:

- Private pension benefit accruals are substantial, averaging around 20 percent of annual wages between the ages of 55 and 65. These are equivalent to an average 20 percent subsidy on more years of work.

- In such basic plans, the accruals in pension wealth continually increase because with each additional year of work, employees increase their service credits and possibly wages,[55] both of which enhance their pension benefits.

- Such basic plans create no strong incentive to retire before age 65. The incentive is to continue working and accumulate the growing accruals associated with increased service credits and seniority-based wage increases upon which such pension benefits are based.

- The abrupt drop in pension wealth accruals at the normal retirement age of 65 (from 28 percent of wages at age 65 to zero at age 66) highlights the significant monetary disincentive to continue working past that age even if one can continue working. The drop in pension wealth accruals after age 65 is equivalent to a 28 percent wage cut in that year. The drop occurs in spite of the fact that the pension benefit itself is adjusted on an actuarially fair basis to exactly compensate for the fact that it is received later. The reduction in pension wealth accruals occurs solely because the individual is not accumulating additional service credits upon which the pension calculations are based.

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[54] As discussed previously in section 4.1.1, "Pension Wealth Accruals", accruals are the annual increments in pension benefit wealth from working one more year and retiring at the end of that year. Accruals are expressed as a proportion of annual earnings in that year. They are not additive since the worker must retire at the end of the year to get the pension benefit accruals.

[55] Constant wages are assumed over the workers' working life, although pension wealth can be affected by wage changes in real life.

- The shape of the private pension accruals highlights how such pensions lead to significant "backloading" of compensation, coming later in the employees' career, creating a strong incentive for the employee to remain with the organization, but also creating significant wealth losses if the employee is terminated.

The CPP/QPP integration (bridging) offset would lead to a reduction in the employer pension if the employee retired early at age 55, since the pension benefit formula with the integration offset would have been 1.4 percent of earnings instead of 2 percent of earnings without the offset up to YMPE.

Subsidized Early Retirement

Exhibit 4.1 illustrates the effect of subsidized early retirement at the age of 55 for employees with at least 10 years of service in their private pension plan.[56] In the subsidized early retirement plan, the employee receives a large pension wealth accrual (equal to 24 percent of earnings in that year) at age 55, when the early retirement feature becomes available. The wealth accrual is highest at age 55, since the subsidy is extended over a 10-year period (from age 55 to 65). After age 55, the wealth accrual steadily declines, since employees effectively forgo a year of subsidy for each year they continue to work past the age of subsidized early retirement.

The incentives to retire early are particularly strong when compared with the incentives under the Basic Plan. In that plan, the accruals continually increased from 13 percent of wages at age 55 to 28 percent of wages by age 65, reflecting the pension wealth enhancement of additional service credits and possible wage increases. In contrast, in the Subsidized Early Retirement Plan, these features are at work but they are vastly outweighed by the early retirement subsidy, the value of which declines as the employee continues working up to age 65.

Special Retirement

Exhibit 4.1 illustrates the pension wealth accruals when a private pension plan also includes special provisions for retirement at age 60.[57] These provisions lead to a huge increase in pension wealth at the milestone age of 60, when an employee is first eligible for the special retirement benefit. Specifically, the increase in their pension wealth is

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[56] The subsidy occurs because the benefit reduction is less than the actuarially fair reduction that would reduce the annual benefits to exactly compensate for the fact that they are received sooner and for a longer period of time.

[57] Under special retirement, the employee qualifies for an immediate and unreduced pension; that is, there is no actuarial adjustment to reduce the pension for the fact that it is received earlier and for a longer period of time.

EXHIBIT 4.1

Total Private and Private/Public Pension Plan Wealth Accruals as a Proportion of Wages by Plan-Type with No CPP Bridging Supplement for Base-Case: Worker Earns Median Wage Percentages

	Basic Plan		Subsidized Early Retirement		Subsidized Early and Special Retirement	
Age	**Private**	**Private/Public**	**Private**	**Private/Public**	**Private**	**Private/Public**
55	13%	18%	25%	29%	25%	29%
56	14	14	25	25	25	25
59	17	13	21	17	21	17
60	18	12	19	13	171	165
61	20	13	17	10	-17	-24
62	21	15	16	10	-19	-25
63	23	16	14	7	-20	-27
64	26	9	11	-6	-21	-38
65	28	00	9	-19	-22	-50
66	00	32	00	-32	00	-32
69	00	-23	00	-23	00	-23

Source: SPR Background Study by Morley Gunderson, Douglas Hyatt, "Simulations of Incentive Effects of Private and Public Pensions", Table A. Household comprises a man born January 1, 1930, with a spouse born January 1, 1933. Man has worked since 30 years of age at median wage. Wife has never worked. The age of 65 for the man corresponds to the year 1995, and this is the case in the exhibits which follow in this chapter.

almost twice (1.71) their wage earnings for that year. Their total compensation for that year is almost three times their annual wage.

This large increase in pension wealth occurs in that particular year because the effect of receiving the full pension for the additional five years between the ages of 60 to 65 all gets capitalized into the pension wealth at age 60. By retiring at that time, the employee does forgo any additional service credits and possible wage increases that could enhance pension wealth if he/she continued to work between the ages of 60 and 65, but this is more than offset by the receipt of the full pension for an additional five years; hence, the large spike in pension wealth at age 60.

After age 60, the pension wealth accruals become negative. As illustrated in Exhibit 4.1, at age 61 the private pension wealth accruals are minus 17 percent of the person's wage; in effect, the total compensation for a person continuing to work that year would be 83 percent of his/her wage. But the total stock of pension wealth remains high at that year, since the person could still retire at age 61 and receive their unreduced pension for four more years, compared with five years if they retired at age 60.

Bridging Supplements

The bridging supplements have the same effect in all the plans. When they are added to the basic plan or to the plan with subsidized early and special retirement, they effectively create two substantial spikes — one at age 55, when the bridging supplements apply, and one at age 60 when special retirement applies. These amount to spike effects at age 55 of 68 percent for the basic plan and 74 percent for the other plans.[58] The impact of bridging supplements is discussed further in Section 4.3.

4.3 Estimation Results: Private and Public Plans

4.3.1 Median Earnings Household

Basic Plan

Exhibit 4.1 also shows that the combined effect of private and public pension plans is to create a mild incentive to continue working between the ages of 55 and 65 provided there are no bridging supplements and no early or special retirement features. This leads to accumulated pension wealth accruals typically averaging around 13 percent of earnings. This is the result, however, of the negative incentive effects of the public plans being more than offset by the positive incentive effects of the basic private plans. After age 65, there are strong financial disincentives emanating solely from the public plans.

If the individual in these simulations works one year beyond the age of 55, he obtains a public pension wealth accrual effect of 5 percent (the difference between column one and two in exhibit 4.1). It is a positive pension wealth accrual effect of 5 percent expressed as a percentage of the employee's wage in that year following his 55th birthday, hence an implicit subsidy (5 percent) on earnings on further work in that year. On the other hand, if he works to the age of 60, there is a negative pension wealth accrual effect of 6 percent, or an implicit tax on work in the year following his 60th birthday.[59]

When bridging supplements are added (Exhibit 4.2), so that the CPP/QPP integration offset is waived for persons who take early retirement, a similar pattern prevails as when there is no bridging supplement, but with two notable differences. The bridging supplement gives rise to a huge spike or pension wealth accrual at age 55, as occurred previously under the basic private plan alone. Similarly, the subsequent changes in accruals are smaller and more in the neighbourhood of 6 percent of wages until the age of 65. This reflects the fact that the "value" of the bridging supplement is capitalized into pension wealth at the age of 55 when it first becomes available. After age 55, although the stock of pension wealth remains higher, the increments to that wealth are smaller because they are already capitalized into the larger base from which the increments are calculated.

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[58] See related background study by Gunderson. The impact of bridging supplements, although it could be examined at greater length in this context, is discussed further in Section 4.3, "Estimation Results", Private and Public Plans".

[59] To work during the year after his 66th birthday means a negative pension wealth accrual effect of 32 percent, on account of the public pension system, or an implicit tax on earnings in that year of 32 percent (Exhibit 4.1).

EXHIBIT 4.2

Total Private and Public Pension Plan Wealth Accruals as a Proportion of Wages by Plan Type with CPP Bridging Supplement Base Cases: Worker Earns Median Wage Percentages

Age	Basic Plan	Subsidized Early Retirement	Subsidized Early and Special Retirement
55	73%	79%	79%
56	13	25	25
59	7	14	14
60	7	9	177
61	6	4	-37
62	7	1	-38
63	-6	-4	-41
64	-4	-19	-53
65	-15	-35	-67
66	-32	-32	-32
69	-23	-23	-23

Source: SPR Background Study by Morley Gunderson, Douglas Hyatt, "Simulations of Incentive Effects of Private and Public Pensions", Table A. Household is comprises a man born January 1, 1930, with a spouse born January 1, 1933. Man has worked since 30 years of age at median wage. Wife has never worked. The age of 65 for the man corresponds to the year 1995.

Under the restricted set of conditions of the base cases, the total private and public financial incentives under the Basic Plan with bridging supplements are to encourage early retirement at age 55 when the bridging supplement first applies. If one does not retire at that age, there is a mild incentive to continue working, since total pension wealth is augmented slightly because the positive wealth accruals from the private plans slightly offset the negative accruals from the public plans. Whether the small positive pension wealth accruals are sufficient to offset any increased disutility of work is an open question. At age 65, however, there is a strong incentive to retire, since pension wealth accruals become significantly negative at that age.

Subsidized Early and Special Retirement

The effects of combining the public pension plans with private pension plans containing subsidized early retirement and special retirement provisions tend to reinforce the effects of adding these provisions to a basic plan. Essentially, the pattern of the private pension wealth positive accruals from the private plans prevails under the restricted set of conditions of the base cases, peaking at age 55 for subsidized early retirement and at ages 55 and 60 for plans with the additional special retirement feature. But that pattern is increasingly offset by the negative accruals that emanate from the public plans between the ages of 55 and 60, and totally offset after the age of 60 as a result of the large negative effects from the public plans. As a result, there is an increased incentive to retire around the milestone ages of 55 and 60.

Summary of Private and Public Base-Case Accruals

Clearly, both public and private plans create financial incentives that can have a potentially important effect on the retirement decision. The public plans themselves generally create an inducement to retire early because of the negative pension wealth accruals associated with continued work. Certainly, there is a strong incentive to retire before age 65, after which the "penalties" become substantial, in the order of 30 percent of wages each year for a median wage earner.

For someone born in 1930 (with a wife who is three years younger and never worked) and who has worked for 30 years at the median wage, the positive combined private-public wealth accruals (or implied subsidies on continued work) peak at 73 percent at the age of 55 with a basic private pension plan and only a CPP bridging supplement (Exhibit 4.2). This compares with the same individual in receipt of subsidized early or special retirement, which would experience a peak wealth accrual or subsidy offset of 177 percent at the age of 60. The latter combination of private-public pension plans then drops to negative pension wealth effect of 37 percent at age 61 and a further negative accrual effect of 67 percent at the age of 65. But for the same individual positive private/public wealth accruals peak at only 18 percent at the age of 55 without a CPP bridging supplement and no subsidized early or special retirement private pension features then dipping and rising to 16 percent at age 63. These effects then drop to zero by age 65. Of course the actual incentive effects in typical situations depend on the choices facing the individual, the conditions of his/her plan and his/her work history.

Within the assumptions of the base cases CPP/QPP Bridging supplements and subsidized early and special retirement features create strong incentives to work until those milestone dates when those features first apply (ages 55 and 60), and then to retire. Nevertheless, the positive pension wealth accruals that generally prevail even after those milestone dates still provide an incentive to continue working and accumulate the additional pension wealth. The total combined public and private pension wealth accruals only become negative after age 60, when there is subsidized early and special retirement, and around age 65, when there is no subsidized early or special retirement.

4.3.2 Higher and Lower Earnings Households

Total Private and Public Accruals for High-Wage Employees

The total private and public pension wealth accruals for employees at 150 percent and 200 percent of the median base-case wage are illustrated respectively in Exhibit 4.3. Negative accruals are much smaller and come much later because high-wage employees are not subject to the clawbacks of public pension plans. Otherwise the general pattern of incentives is similar to those of median-wage employees (Exhibit 4.1 and 4.2).

Total Private and Public Accruals for Low-Wage Employees

The corresponding impacts were estimated for total private and public pension accruals for a very low-wage employee at the bottom 10th decile of the wage distribution. Total accruals drop more rapidly for a low-wage employee compared with a median-wage employee and they take on larger negative values around and after the age of normal retirement of 65.[60]

This pattern is entirely a result of the negative public pension wealth accruals that increase with age under the public pension plans and that are especially prominent for low-wage employees. The negative accruals are more prominent for low-wage employees because, if they continue to work, they face clawbacks or reductions in public pensions (GIS, SPA) that are means tested.[61] Low-wage employees face higher (implicit) taxes on earned income than do higher wage employees because their means-tested benefits are reduced if they continue to work and earn income. This is a natural by-product of transfer programs that are targeted to the poor but that try to reduce spillover benefits to the non-poor by reducing the transfer as income rises.

Such clawbacks, however, can have adverse work incentive effects, especially when they involve implicit taxes of as high as 50 percent, as is common for older, very low-wage employees who would work beyond the age of 65.[62] Low-wage employees may have little financial incentive to continue working to alleviate any poverty condition. The taxes may be implicit in that they involve reductions in transfer payments, but that is no less real than taxes that are explicitly levied.

There is some limited international comparative analysis for public pension wealth effects. Pension accrual effects at older ages are an important consideration in the retirement decision in many countries.[63] Canada compares favourably with respect to disincentives to continued working at older ages. One measure — implicit tax on further work between the ages of 55 and 69 from social security programs — suggests that work disincentives in Canada are among the lowest in the industrial world, only marginally higher than the U.S., Japan and Sweden and much lower than most Western European countries.[64]

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[60] See Gunderson background study for details. At age 65 there was a 40 percent negative pension wealth accrual effect, for this household, with no extra benefits except a CPP/QPP bridging supplement, 21 percent without one, compared with a median income household effects of negative pension wealth accrual effect of 15 percent with bridging supplement, and no effect without one at the same age.

[61] For every dollar of private or CPP pension income, GIS and SPA benefits are reduced by 50 cents. As well, OAS benefits are reduced 15 cents on the dollar when personal gross income exceeds about $52,000. So is an age-related tax credit reduced 15 cents on the dollar when personal gross income is greater than approximately $24,000.

[62] This is the case for the worker in the household being simulated who, if he works in the 66th year, faces an implicit tax of 52 percent (the combined negative private and public accrual rate). These estimates are for the 10th decile of the wage distribution. See related background study, Table B.

[63] See Organization for Economic Cooperation and Development, *Maintaining Prosperity in an Aging Society*, (Chapter 3 Ageing Populations, Labour markets and The Retirement Decisions), 1998.

[64] See Jonathan Gruber and David Wise, eds. *Social Security Programs and Retirement Around the World*, A National Bureau of Economic Research Conference Report. Chicago and London: The University of Chicago Press, 1999.

EXHIBIT 4.3

Total Private and Public Pension Plan Wealth Accruals as a Proportion of Wages by Plan Type with CPP Bridging Supplement Worker Earns 1.5 and 2 times Median Wage Percentages

	Basic Plan		Subsidized Early Retirement		Subsidized Early and Special Retirement	
Age	1.5 x Median Wage	2 x Median Wage	1.5 x Median Wage	2 x Median Wage	1.5 x Median Wage	2 x Median Wage
55	61%	50%	69%	59%	69%	59%
56	14	15	27	28	27	28
59	12	15	17	20	17	2
60	12	15	13	16	188	198
61	12	15	9	13	-32	-30
62	12	16	6	10	-34	-32
63	12	16	1	5	-38	-35
64	6	13	-9	-3	-46	-4
65	-2	8	-22	-3	-56	-49
66	-22	-16	-22	-16	-22	-16
69	-15	-11	-15	-11	-15	-11

Source: See SPR background study, "Simulations of Incentive Effects of Private and Public Pension Tables C-D. Man has worked continuously since the age of 30 at either twice or 1.5 times the median annual wage.

4.4 Summary Picture of Pension Accruals and Retirement Incentives

The simulation results indicate that the pension wealth accruals under the combination of public and private pensions can potentially affect retirement decisions.

- The pension plan simulations illustrate how Canada's public and private pension system gives rise to a complex set of pension wealth accruals at different ages for recent retirees who experienced a continuous work history. These positive or negative pension wealth accruals act as a form of implicit subsidy or tax on income earned in a given year. The resulting financial incentives or disincentives might potentially be expected to have important effects on retirement decisions. The wealth accruals and associated financial incentives vary by such factors as the individual's wage as well as the institutional features of defined-benefit employer-sponsored private plans (RPPs), bridging supplements (where the CPP/QPP and private pension plan integration offset is waived) and subsidies to early retirement and special retirement. When pension wealth accruals and associated financial incentives were estimated for selected households under a restricted set of conditions the following conclusions emerged:

- In "basic" private plans (defined-benefit RPPs) with no bridging supplements and no early or special retirement features, accruals tend to increase with age, but abruptly drop to zero at the age of normal retirement of 65. This pattern potentially creates an incentive to continue working to age 65 and then to retire. Private pension plan accruals are potentially substantial, averaging around 20 percent of annual wages between the ages of 55 and 65 for a wide range of incomes. These are equivalent to an average 20 percent subsidy on more years of work.

- Private pension (defined-benefit) plans with CPP bridging supplements and subsidized early/special retirement tend to create large positive spikes in pension wealth accruals at the dates when such features apply. Such spikes, followed by declining and possibly negative accruals, create financial incentives to work up to the milestone date, and to retire early.

- Although low-wage employees have smaller total private pension wealth, since it is based on their wage, their relative pension wealth accruals (expressed as a percent of their wage) is fairly similar to that of high-wage employees.

- Within the assumptions of the base cases, the combined effect of the public and private pension plans (defined-benefit RPPs) might potentially encourage retirement soon after 60 to maximize pension wealth for a recent retiree. For such base case workers potential dis-incentives (negative accruals) arising from public pensions, especially after age 60, work in the opposite direction to the incentives from the private plans (positive accruals) for employees in basic defined-benefit plans with no "early or special retirement features" at later ages but are not large enough to offset the private plan incentives. Total pension wealth accruals remain positive at least until around age 65 when they become substantially negative because of certain aspects of public plans, notably the income-testing of GIS and SPA for low-income seniors.

- For private pension plans with "subsidized and special retirement", combined pension wealth accruals are potentially very large and positive, or peak at 55 and 60, and become negative after age 60. They become negative at the age of 64 in the case of private plans with only "subsidized early retirement". After age 60, the negative accruals of the public plans augment the retirement inducing effect of the private plans.

- The retirement-inducing potential of both private and public pensions combined was prominent for low-wage recent retirees since they were more likely to experience a rapid drop in accruals, especially larger negative public pension accruals (OAS/GIS/SPA), if they continued working. There were implicit taxes as high as 50 percent on paid employment beyond age 65. This would have occurred primarily because low-wage employees faced high clawbacks in income-tested public pensions (GIS/SPA) if they continued to earn income.

- Private pension wealth accruals are potentially zero after maximum years of service which in the modelling is age 65 in private pension plans, and they are potentially substantially negative in combined private/public plans at that age, without any special/early retirement benefits, or CPP bridging supplements.

- For someone born in 1930 who worked continuously for 30 years at the median wage (with a wife who is three years younger and who never worked), positive private/public wealth accruals (or implied subsidies on continued work) peak at 73 percent at the age of 55 with a CPP bridging supplement only. This compares with the same individual in receipt of subsidized early or special retirement who would experience a peak positive wealth accrual or subsidy effect of 177 percent at the age of 60. These become negative pension wealth effects (i.e., an implicit tax) of 37 percent at age 61 on income from another year's work and a further negative accrual effect of 67 percent at the age of 65. But for the same individual positive private/public wealth accruals peak at only 18 percent at the age of 55 without a CPP bridging supplement and no subsidized early or special retirement private pension features then dipping and rising to 16 percent at age 63. These effects then drop to zero by age 65. (Of course the actual incentive effects depend on the choices facing the individual, the conditions of his/her plan and his/her work history.)

- RRSPs and defined-contribution private pensions (RPPs) do not contain these retirement incentive effects. They do not have the clawbacks of pension benefits that exist in the public plans that are income-tested, nor do they have the early and special retirement features of private defined benefit plans. Thus, even though RRSP accumulations are important for persons at higher levels of pre-retirement income, they do not give rise to the spikes in pension wealth accruals that would influence retirement decisions at specific ages for large numbers of near-retirees.

- There is some limited international comparative analysis for public pension wealth effects. Pension accrual effects at older ages are an important consideration in the retirement decision in many countries. Canada compares favourably with respect to disincentives to continued working at older ages. One measure — implicit tax on further work between the ages of 55 and 69 from social security programs — suggests that work disincentives in Canada are among the lowest in the industrial world, only marginally higher than the U.S., Japan and Sweden and much lower than most Western European countries.

The public and private pension system should be regarded not only as a form of saving for retirement, but also as a system that has a potentially important set of incentives that can affect retirement decisions. This analysis has not assessed the extent to which the retirement income system affects how widespread these incentives are, and the decision to retire.

It is important to note that pension wealth accruals is only one measure of potential incentives to retire. For instance, even where pension wealth accruals are low or negative, the income replacement rate may be so low as to strongly encourage continued working. In addition other factors affect an individual's decision to retire.

5. A Statistical Analysis of Factors Influencing Retirement[65]

As discussed previously, the retirement decision essentially is a decision not to continue participating in labour market activities. As such, it is conventionally "modelled" in the context of the income-leisure choice perspective of economics. Individuals will retire if their expected well-being or utility when retired exceeds their well-being if they continue to participate in labour market activities. The calculation is a forward-looking one, based on expectations of future factors in the state of retirement versus continued employment.

This framework provides a convenient way of analysing the expected effect on the retirement decision of a wide range of factors that can influence that decision. These include personal and labour market characteristics of the individual and their family circumstances, as well as institutional factors, including the financial incentives embodied in public and private pension plans as outlined in the Chapter 4 simulations.

This section provides an econometric analysis of a wide range of factors believed to influence the retirement decision. It is based on Statistics Canada's GSS, Cycle 9, the best currently available database for this kind of investigation of Canada's changing retirement patterns. The analysis focuses on two measures of retirement used as dependent variables. The first is a self-reported measure of the respondent's planned age of retirement. The second is the actual retirement decision from a group of potential retirees.

The analysis proceeds as follows. First, the data set and its construction are briefly described. Second, the distribution of the planned ages of retirement are portrayed separately for persons 45 and older, and for younger persons ages 16 to 44. Third, the explanatory variables used in the subsequent regression analysis are briefly discussed. Fourth, the econometric results of the regression analysis are presented separately for the planned age of retirement and for the actual retirement decision. Fifth, the overall results are summarized.

5.1 Data Availability

The econometric analysis is based on the GSS, Cycle 9, conducted in 1994, which examined Canada's changing retirement patterns among other things. The Statistics Canada's GSS series deals with general social phenomena, emphasizing demographics, social characteristics and living conditions; however, the GSS, Cycle 9 focused on issues of work and retirement. Thus these data are highly appropriate for an analysis of the factors influencing the retirement decision.

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[65] See SPR background study by Morley Gunderson, "Analysis of Factors Influencing Planned and Actual Retirement Decisions", 2001, for more details.

The following explanatory variables were examined as potential determinants of the retirement decision: respondent's gender, education, age, health status, spouse status, non-labour market income, region, covered by a collective agreement, industry and occupation prestige.[66]

The target population of the GSS is all persons age 15 and over living in the 10 provinces and not residing full-time in institutions. The sample for Cycle 9 consists of 11,876 respondents, with a disproportionate number age 55 to 74, given the emphasis on retirement issues.

In this analysis, two dependent variables are utilized: (1) the planned age of retirement, for persons who had not already retired; and (2) the actual retirement decision, as indicated by a dummy variable coded 1 if the person had retired in the previous five-year period, 1990-94, and 0 if they continued in employment. The five-year period had to be used since, for confidentiality purposes, the Public Use files aggregate the retirees into groups of years when they retired (e.g., 1990-94, 1985-89, 1980-94, etc.).

Because the focus is on retirement plans or retirement decisions, the data set had to be restricted to persons who were employed or previously employed and could reasonably be considered to be making retirement plans or retirement decisions.

Selecting the subsample to analyse the *planned age of retirement* first entailed identifying persons who provided a planned age of retirement, including the response that they "do not intend to retire". From the original sample of 11,876, this yielded a subsample of 6,042.

The second filter entailed selecting persons whose main activity in the past 12 months was working at a job or business. This reduced the sample size to 4,180, of whom 1,518 were 45 and older, and 2,662 were between the ages of 16 and 44.

The econometric analysis of the *planned age of retirement* was restricted to the subsample of 1,518 persons 45 and older because of the desire to ascertain the importance of such institutional features as employer pension plans. These are the employees who are most likely to know their pension plan features and hence to have their retirement plans shaped by those features.

The econometric analysis of the actual retirement decision was restricted to the subsample of persons who were potential retirees and who were making a decision to retire or continue working in the labour market. This was done by selecting persons 45 years of age and over and whose main activity five years ago was working at a job or business. The main activity five years ago had to be used because the retirement decision was based on the previous five-year period, 1990-94. From the original sample of 11,876, this yielded a subsample of 2,692 potential retirees, of whom 487 or 18 percent had retired within the last five years (1990-94).

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[66] Besides individual pension wealth accrual effects, important determinants of the retirement decision could not be included in these estimations. These included the potential employability by occupation category in 1995 or economy-wide macro determinants of demand for different categories of older worker labour, assuming these individuals were willing and able to work. The occupational status of these individuals could not be identified.

Because the actual retirement decision was based on whether the person had retired in the previous five-year period (1990-94), it was necessary to use information for the person's industry and occupation as well as any coverage by a collective agreement and employer pension plan that corresponded to their status immediately before that five-year period.

5.2 Distribution of Planned Age of Retirement

Employed Persons Age 45+

Exhibit 5.1 presents the distribution of the self-reported planned age of retirement for the 1,518 employed persons age 45 and over in the data set and who had not already retired.[67] As suggested in Chapter 4, there are large spikes or bunching up of the planned retirement ages at specific ages, notably age 65 (25 percent of respondents), age 60 (21 percent of respondents), and age 55 (13 percent of respondents).

Overall, almost 60 percent of the respondents who had stated their retirement preferences, and who had not already retired, planned to retire at one of those three specific ages. Obviously, this does not reflect those persons who had already retired at those ages, since they would not be included in the data set selected for this analysis.

The last column of cumulative percents in Exhibit 5.1 indicates that for persons 45 and over who had not already retired, 17 percent planned to be retired by age 55, 45 percent planned to be retired by age 60, and almost 77 percent planned to be retired by age 65.

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[67] The tabulations represent the 1,518 persons who responded with a specific planned retirement age or with the specific statement that they do not intend to retire. It does not include the 1,306 respondents who said that they did not know, nor does it include the 46 respondents who did not state a planned retirement age. The latter two figures are not used in the analysis.

EXHIBIT 5.1
Planned Retirement Age of Employed Persons 45 Years of Age and Older, and Age 16 to 44

	45 years of Age and Over		**Ages 16 to 44**	
Ages	**Proportion %**	**Cumulative %**	**Proportion %**	**Cumulative %**
50	1.3	1.4	9.8	13.9
55	13.4	16.7	31.7	47.5
60	21.3	45.2	17.0	68.5
65	24.8	76.6	18.9	88.5
70	1.3	82.1	0.8	89.5
75	0.5	82.9	0.2	89.7
80	0.2	83.1	0.1	89.8
Never retire	16.6	99.7	10.1	99.9

Source: Statistics Canada GSS Cycle 9: data for 1994. Of the total number of respondents, 11,876, some 1,518 employed persons were 45 years of age and over. Adapted from Table 1A in the SPR background study by Morley Gunderson, "Analysis of Factors Influencing Planned and Actual Retirement Decisions", 2001.

The other notable feature of the table is that 17 percent of the respondents who made a specific statement about their retirement age indicated that they do not intend to retire (last row). This is a large figure, especially considering that a substantial portion of respondents would be subject to a mandatory retirement policy. The large numbers who indicated that they do not intend to retire suggests that the distribution of planned retirement ages would be much more pronounced at the later ages if these persons were included in that distribution.

While age 65 is the most common planned age of retirement, it is the expected age for only about 25 percent of the older work force who report a planned age of retirement or give the explicit statement that they do not intend to retire. The planned age of retirement can be characterized as exhibiting considerable diversity with some well-defined spikes.

The spikes appear to reflect two factors. First, they occur at the ages when institutional features of public and private pension plans apply. Specifically, age 65 is the age of receipt of normal CPP/QPP benefits, and it is the common age of normal retirement in private occupational pension plans, and is also often accompanied by mandatory retirement. Age 60 is the age of eligibility for early CPP benefits. Also, age 60 to 62 are common ages for special early retirement in private occupational pension plans and for which there is no actuarial adjustment to offset the fact that pensions are received earlier and for a longer period of time. Age 55 is a common age for subsidized early retirement in private occupational pension plans. Thus these results are consistent with a number of findings from the estimations reported in Chapter 4.

Second, the spikes also likely reflect "rounding" to five-year designations (e.g., 60, 55, 50) on the part of respondents as they are all five years apart, vis-a-vis the "normal" retirement age of 65. Such "rounding", however, could not explain the large spikes that occur at ages like 65, 60 and 55, suggesting that the previously discussed financial incentives of public and private pension plans are very likely important influences on the planned ages of retirement.

Employed Younger Persons Ages 16 to 44

The tabulations in Exhibit 5.1 suggest strongly that younger workers plan to retire much earlier than do older workers. For example, the most common planned age of retirement for younger workers is age 55 (32 percent) compared with age 65 (25 percent) for older workers. A substantial number of younger workers (10 percent) even planned to retire at age 50.

As was the case for older workers, the spikes at specific ages of five-year intervals are prominent, but for younger workers the spikes have all shifted to earlier ages. This is perhaps most clearly illustrated by the cumulative distribution. For older workers, 45 percent of the work force planned to retire by age 60; for younger workers, a comparable figure of 48 percent was reached by age 55. The effect is even more dramatic at earlier retirement ages. For older workers, only 17 percent of the work force planned to be retired by age 55; for younger workers, 48 percent planned to be retired by that age.

The strong pattern of earlier planned ages of retirement amongst younger persons is all the more remarkable given that they can also anticipate a longer life expectancy and hence a much longer post-retirement period. Furthermore, it is at odds with the stereotype which is now popular, of the X-Generation never being able to afford the luxuries of their parents, including the luxury of amassing sufficient savings to be able to afford to retire early. This is especially the case if the younger generations may also inherit the financial burdens associated with supporting liabilities of pay-as-you-go pensions for a rising proportion of seniors.[68]

In spite of these forces which could work against their being able to retire earlier, younger workers have clear plans to retire at a younger age than do their older counterparts. This highlights that the expectations amongst younger workers are in the direction of earlier retirement, and the magnitudes are quite substantial.

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[68] Of course, younger generations also stand to inherit considerable financial wealth from older generations

5.3 Determinants of Planned Retirement Age[69]

Exhibit 5.2 sets out the regression results (ordinary least squares) for the dependent variable planned age of retirement. Those who reported that they never plan to retire are initially excluded from the analysis. The sample size of 1,266 corresponds to the 1,518 total respondents age 45 and over, less the 252 who said that they did not plan to retire.[70]

The coefficient[71] on the male dummy variable indicates that, other things equal, the planned retirement age for males was almost one year (0.79 of a year) later than for females.

The planned retirement age increases substantially with the age of the respondent. Relative to the omitted reference category of ages 45 to 49, the planned retirement age is 1.4 years greater (later) for persons age 50 to 54, rising to 3.3 years greater (later) for persons age 55 to 59, 5.3 years greater for persons age 60 to 64, nine years greater for persons age 65 to 69, and 13 years greater for persons age 70 and over. In essence, every five-year increment in age is associated with a two- to four year increase in the planned age of retirement. Other things equal, younger workers (even among workers age 45 and over) clearly plan to retire earlier.

Older persons who remain in the labour force have, by not already retiring, revealed their preference for a later retirement age. The large coefficients for the age groups 65 to 69 and 70 and over (indicating the additional years they would work compared with the 45 to 49 age group) also highlight the potential role of the financial incentives of private pension plans. Such workers are beyond the age at which early and special retirement features would apply if they had pension plans with such features. Without any such incentives towards early retirement, they clearly plan to work much longer, even in spite of their age.

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[69] See related SPR background study for a detailed analysis of the descriptive statistics comprising the GSS Cycle 9 data on Canada's changing retirement patterns.

[70] For observations that had a missing value on a variable, the mean value of that variable was substituted for the missing value. As indicated in the descriptive statistics table, such missing values were rare and they were confined exclusively to respondents financial status variables of received interest income, received other income or owned a home.

[71] In all of the regression results that follow, the coefficients are statistically significant if they exceed the critical t-values of 1.65 and 1.96, respectively, at the 0.10 level and 0.05 level, based on a two-tailed test. In general, when the coefficients are discussed in the text, they are statistically significant unless otherwise stated.

EXHIBIT 5.2

How Planned Retirement Age is Affected by Selected Influences Expressed as Additional (+) Years of Work or Less (-) Years of Work Vis-a-vis the Comparison Group (Excluding Persons Who Indicated They Will Never Retire)

Comparison Group:	(Female)	Years
	Male	0.8
Comparison Group:	(Ages 45-49)	
	50-54	1.4
	55-59	3.3
	60-64	5.3
	65-69	9.1
	70 +	13.4
Comparison Group:	(Less than high school)	
	University graduate	0.7*
	High school graduate	0.2*
Comparison Group:	(No spouse)	
	Spouse keeping house	-0.8
	Spouse working	-0.9
	Spouse already retired	-1.1
Comparison Group:	(In poor health)	
	Persons in fair health	2.5
	Persons in excellent health	3.1
Comparison Group:	(No other income)	
	Receiving other income	0.6*
Comparison Group:	(Don't own a home)	
	Own a home	-1.9
Comparison Group:	(No employer pension plan)	
	Employer pension plan	-1.3
Comparison Group:	(Region of Ontario)	
	Atlantic	-0.6*
	Quebec	-0.9
	Manitoba/Saskatchewan	-0.2*
	Alberta	-0.1*
	British Columbia	-0.3*
Comparison Group:	Occupational prestige index	-0.08

Source: See SPR background study by Morley Gunderson, "Analysis of Factors Influencing Planned and Actual Retirement Decisions". These estimates were derived through ordinary least squares and are statistically significant unless otherwise indicated (*).

There is not a strong pattern with respect to education, although university graduates plan to retire about two-thirds of a year later (0.7 of a year) than do persons with less than high school. This effect is statistically significant, however, only at the 0.13 level.

Persons whose spouse is working in the labour market or keeping house plan to retire almost a year earlier, and persons whose spouse is already retired plan to retire slightly more than one year earlier, compared with persons without a spouse. This illustrates the complementary nature of retirement plans within the family. Alternatively stated, it highlights that persons without the family ties of a spouse are more likely to continue working.

The planned age of retirement continually increases with the health status of the individual. Relative to persons in poor health, the planned age of retirement increases by 2.5 years for persons who report their health as fair, rising to three years for persons who report their health as excellent.

Persons who own a home plan to retire about two years earlier than do people who do not own a home. This likely reflects the retirement-inducing effect of higher wealth associated with home ownership.

Persons with an employer pension plan expect to retire about 1.3 years earlier than persons who are not covered by a plan. This likely reflects the wealth effect of such plans since they enable people to afford to retire. It may also affect the financial incentives or subsidies towards early retirement that are often embodied in such plans, especially through their early and special retirement features. The imperfect nature of this variable (due to lack of specifics as to the type of pension plan and their characteristics by category of workers), however, precludes more precise statements about the retirement-inducing effects of such plans.

The significant negative coefficient on the occupational prestige index[72] indicates that persons in high-status occupations plan to retire sooner. This suggests that the wealth effect of such high-status occupations dominates any tendency to postpone retirement emanating from the prestige and likely higher wage associated with continued employment. The magnitude of the coefficient indicates that each unit increase in the index (which ranges from a low of 1 to a high of 16) is associated with a reduction of 0.08 (i.e., less than one-tenth of a year) in the planned age of retirement. Alternatively stated, persons at the highest end of the scale have a planned age of retirement that is 1.3 years younger (16 x -0.08) than do persons at the lowest end of the scale.

There is little variation in the planned age of retirement across industries after controlling for other factors believed to influence the retirement decision. All of the industry variables are statistically insignificant.

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[72] The occupational prestige index ranges from 1 to a high of 16 classification for occupations from lowest to highest status.

Persons in Quebec plan to retire almost one year earlier than do persons in Ontario, and persons in the Atlantic provinces plan to retire about six-tenths of a year earlier than do persons in Ontario. Planned retirement ages in the other provinces are similar to those in Ontario (but their coefficients are small and statistically insignificant).

Impact of including the "Never Retire" Category

When those who indicated they will never retire are distributed into the later retirement ages according to their remaining life expectancy, the gender coefficient remains positive but becomes statistically insignificant.[73] Males now have a planned retirement age that is similar to that of females, rather than being later than that of females, as was the case when those who indicated that they never plan to retire were excluded from the analysis. This clearly reflects the fact that women who plan never to retire are given a later planned age of retirement because of their longer life expectancy. This may also reflect the fact, however, that women may have indicated that they never plan to retire because they are less likely to have an employer pension plan with its retirement-inducing features, or that if they have such a plan they may want to continue working to accumulate service credits that they may have lost through interruptions for child-rearing activities.

The strong positive effect of age on the planned age of retirement is confirmed and in fact becomes more pronounced. This highlights that older workers were disproportionately more likely to indicate that they never planned to retire and hence were distributed into the later planned ages of retirement.

The effect of education also becomes somewhat more pronounced.

The previous positive relationship between health and the planned age of retirement remains positive but diminishes in magnitude and becomes statistically insignificant when those who indicate that they never plan to retire are included in the analysis. This change is somewhat puzzling, at least to the extent that such persons who indicated that they never plan to retire are likely to be in good health. If so, their being distributed into the later planned ages of retirement should have increased the positive relationship between health and the planned age of retirement.[74]

The effect of an employer pension plan also becomes more pronounced, doubling in magnitude so that persons with a pension plan have an expected age of retirement that is 2.4 years younger than persons without an employer pension plan. This highlights that persons who indicated that they plan never to retire were disproportionately less likely to be covered by an employer pension plan and hence to be assigned a later retirement age based on their remaining life expectancy.

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[73] The estimation results, when including the "will never retire" category, produce slightly more statistically insignificant results than the estimations excluding this category.

[74] It is possible that their poor health status was such that they felt that they could not enjoy retirement or they needed the income from work to pay for health-care costs. It is also even possible that their poor health was such that they expected to die before retiring.

The negative coefficient on the occupational prestige index increases in absolute magnitude (from -0.08 to -0.14), highlighting that persons in high-status occupations plan to retire earlier than do persons in low-status occupations. The fact that this effect became more pronounced when persons who indicated that they plan never to retire were distributed into the later retirement ages, highlights that persons who plan never to retire perhaps disproportionately were in low-status occupations. *This in turn suggests that people who plan never to retire were saying so more out of economic necessity than because they were in high-status jobs.*

5.4 Determinants of Actual Retirement Decision

In this section the focus shifts to the actual retirement decision as indicated by whether potential retirees retired or remained in the labour force. A combination of ordinary least squares and "logit" (logistic) econometric approaches was employed.[75]

As a compromise between clarity of exposition (via the Ordinary Least Squares, or OLS, regressions) and econometric "correctness" via the logistic regressions, the OLS regressions are discussed in the text.[76] In general, the simpler OLS results can be considered as providing reasonable approximations of the effect of the different explanatory variables on the decision to retire. The signs of the relationships, their statistical significance, and relative magnitudes on the retirement decision are similar under OLS and logit regressions.

While there is an obvious relationship between the probability of retiring (as estimated in Exhibit 5.3) and the planned age of retirement (as estimated previously in Exhibit 5.2), that relationship is not straightforward. It may be expected that the coefficients would be opposite in sign; that is, if a variable lowered the planned age of retirement it would increase the probability of retiring. This need not be the case, however, because if the person retired earlier, then they would not be in the group of potential retirees to make the retirement decision. Furthermore, retirement plans need not come to fruition and lead to actual retirement decisions.

The two concepts measure somewhat different things. The planned age of retirement (Exhibit 5.2) measures people's retirement plans or expectations — plans that may or may not come to fruition. The actual retirement or probability decision (Exhibit 5.3) measures the extent to which potential retirees who had not retired any time before 1990 (i.e., before the five-year period prior to the survey year of 1994) actually did retire at some time during that five-year period. In other words, the actual retirement or probability decision measures the probability of retiring during that five year period, conditional upon being employed and not having retired up to 1990.

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[75] See related SPR background study for further details.

[76] The logistic regressions are in an Appendix of the background report and are referred to when the results deviate considerably from the OLS regressions.

Exhibit 5.3 indicates that males had a statistically significant 4.5 percent higher probability of retiring in the five-year period prior to the survey year than did females, after controlling for other determinants of retirement.

EXHIBIT 5.3

How the Higher (+) or Lower (-) Probability of Retiring is Affected by Selected Influences Vis-a-vis the Comparison Group

Comparison Group:	(Female)	%
	Male	4.5
Comparison Group:	(Ages 45-49)	
	50-54	1.8
	55-59	10.2
	60-64	25.7
	65-69	46.3
	70 +	34.5
Comparison Group:	(Less than high school)	
	University graduate	3.1*
	High school graduate	3.9
Comparison Group:	(No spouse)	
	Spouse keeping house	-4.8
	Spouse working	-4.2
	Spouse already retired	11.8
Comparison Group:	(In poor health)	
	Persons in fair health	-6.5
	Persons in excellent health	-7.0
Comparison Group:	(No other income)	
	Receiving other income	4.7*
Comparison Group:	(Don't own a home)	
	Own a home	-0.1
Comparison Group:	(No employer pension plan)	
	Employer pension plan	20.6
Comparison Group:	(Region of Ontario)	
	Atlantic	5.0
	Quebec	-4.2
	Manitoba/Saskatchewan	-2.7*
	Alberta	-2.0*
	British Columbia	-3.5*
Comparison Group:	Occupational Prestige index	-0.7

Source: See SPR background study by Morley Gunderson, "Analysis of Factors Influencing Planned and Actual Retirement Decisions". Tables 3C and 3D. These estimates were derived through ordinary least squares and "logit" estimation and are statistically significant unless otherwise indicated (*). For the data set the average probability of retiring was 18 percent.

The probability of retiring is strongly related to age, consistently increasing with the age of the worker, at least up to the age of 70. While workers age 70 and over had a higher probability of retiring than did workers age 45 to 49, 50 to 54, 55 to 59, and 60 to 64, they had a lower probability of retiring than did workers age 65 to 69. In essence, the probability of retiring actually falls off for the very oldest age group, in spite of their age. This presumably reflects that fact that workers beyond the age of 70 are not likely to be subject to any retirement-inducing effects of employer pension plans. The effect of such plans are likely to be most pronounced for persons age 60 to 64, when early and special retirement features apply, and age 65 to 69, when normal retirement features apply, especially at age 65. These, in fact, are the age groups with the highest probabilities of retiring. This is suggestive of the incentive effects of such plans, albeit only suggestive since their precise impact cannot be determined through this analysis.

The probability of retiring is lowest for persons who are only high-school graduates, with this effect being statistically significant in both the OLS and logit results. The probability of retiring does not continue to increase with higher levels of education, as it falls off for persons with university education.

The probability of being retired is lowest for persons whose spouse continues to work and by far the highest for persons whose spouse has already retired. This highlights the complementary nature of family retirement decisions. It is likely easier for families to do things together if both parties are retired; conversely, there is perhaps less motivation in retiring if one's spouse continues to work in the labour market.

The probability of retiring is lower for persons who are in good health (that is, the coefficients on the health variables are all negative relative to the omitted reference category of poor health). In general, the probability of retiring is approximately 6.5 percent to 7 percent lower for persons who are not in poor health. After controlling for the effect of other factors that influence the retirement decisions, people are much more likely to retire if they are in poor health and to continue working if they are in better health.

The effect of home ownership on the probability of retiring is statistically insignificant (Exhibit 5.3) even though persons who owned their home had an earlier planned age of retirement (by about two years in Exhibit 5.2). But the insignificant effect on the probability of retiring could reflect reverse causality — that is, it may reflect the impact on the regressions of persons who may have sold their home upon retiring.

Employees covered by an employer pension plan have a 21 percent greater probability of retiring than do employees who do not have such a plan. This is consistent with the earlier evidence of Exhibit 5.2, whereby employees with an employer pension plan expected to retire earlier than those who did not have a plan. This evidence is consistent with the fact that such plans can enable people to afford to retire earlier.

The probability of retiring is positively related to occupational prestige, which is consistent with the earlier results of Exhibit 5.2 that the planned age of retirement was negatively related to occupational prestige. The coefficient of 0.007 (0.7 percent) in

Exhibit 5.3 indicates that each unit increase in the occupational prestige index (it ranges from a low of 1 to a high of 16) is associated with a seven-tenths of 1 percent increase in the probability of retiring.

After controlling for the effect of other factors influencing the retirement decision, the probability of retiring is greatest in the Atlantic provinces, and lowest in Quebec and British Columbia.[77]

5.5 Summary Observations

All specifications provide useful information dealing with somewhat different questions. In general, they provide results that are broadly consistent with each other. Furthermore, all have similar R-squares, ranging from 0.32 to 0.39, indicating that the variables used in the analysis usually explain more than one-third of the variation in the retirement measures that are used as dependent variables. These are fairly high for cross-section regressions.

The planned age of retirement measure is likely to be a "cleaner" measure of retirement intentions for the pool of potential retirees, in contrast to the actual retirement measure, which reflects the fact that people who have already retired, perhaps early, are not in the data set as potential retirees.

The following generalizations of the econometric analysis can be made based on the planned age of retirement regressions results. These preferred results, however, are supplemented by the actual or probability of retiring results where appropriate.

- After controlling for other variables that influence the retirement decision, there is no significant difference in the planned retirement ages between males and females.
- The planned age of retirement increases continuously with age, highlighting the fact that younger workers clearly plan to retire earlier than their older counterparts. Older workers (age 65 +) plan to retire 9 to 13 years later than their younger counterparts (the 45 to 49 age group).
- The planned age of retirement generally increases with education, especially for university graduates, who prefer to continue working and retire later.
- Persons with a spouse generally plan to retire earlier than do persons without a spouse. Furthermore, they are more likely to be retired if their own spouse is retired, and less likely to be retired if their own spouse is still employed, highlighting the complementarity of the retirement decision within households.

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[77] Other influences in the retirement decision were also estimated, namely the effects of being employed in different sectors (education, health, public administration, construction, primary production, manufacturing), of receiving other income than wages, of receiving interest income, of being covered by a collective agreement, but results were not statistically significant.

- Persons whose health status was not poor were likely to plan to continue working and retire later, and they were less likely to be retired. This suggests that ill health can be an important factor inducing retirement, after controlling for other variables that also influence the retirement decision.

- Persons in high-prestige occupations plan to retire earlier (Exhibit 5.2) than do persons in low-prestige occupations, and they also have a higher probability of retiring (Exhibit 5.3). This is a somewhat surprising result, however, since the higher prestige and generally higher wage of such jobs should make continued work more attractive and retirement less attractive. It is possible that the higher wealth associated with such high prestige jobs also enables them to afford to retire, and this is not fully controlled for in the analysis by the partial wealth measures of savings (as proxied by interest income) and home ownership.

- After controlling for other variables believed to influence retirement decisions, there is little variation in planned retirement ages (Exhibit 5.2) and retirement probabilities (Exhibit 5.3) across provinces. Persons in the Atlantic provinces tend to plan to retire the earliest, and they have the highest probabilities of retiring. This may well reflect the lower labour market opportunities in that region.

- While the pension wealth simulation results highlight the *potential* importance of the financial incentives of the combined public and private pension system, the econometric results suggest that these potential incentive effects have real effects on the planned age of retirement and on the actual retirement decision.[78] This is indirectly supported by the following results from the statistical analyses:

  — People's planned age of retirement had strong spikes at the same ages (55, 60) as the spikes in pension wealth accruals (accumulations) in illustrative (base case) employer pension plans.

  — Persons with an employer pension plan have an expected age of retirement that is 1.3 years younger[79] than persons without an employer pension plan.

  — Persons age 45 and over with an employer pension plan were over 20 percent more likely to retire than were persons without a plan.

  — The greater likelihood of males retiring may reflect the fact that they are more likely than females to have accumulated the service credits and seniority based wage increases that make early retirement attractive in final-earnings plans.

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[78] Databases do not provide enough detail to permit the incorporation of different retirement-inducing features of employer pension plans directly into such econometric analysis.

[79] It is 2.4 years younger than for persons without an employer pension plan if those who indicated they will never retire are distributed into later retirement ages according to their remaining life expectancy.

- The later planned age of retirement for workers already past age 65, and the fact that their retirement probabilities actually drop off after age 65, likely reflect the fact that they are past any age when early or normal retirement features would apply if they were in occupational pension plans.

The analysis of Chapter 4 highlights the potential retirement-inducing effect of employer pension plans emanating from their features such as early, special and postponed retirement, as well as the fact that they provide a form of saving that enables people to afford to retire. The early and special retirement features create large spikes in pension wealth accruals at the ages to which they first apply, typically age 55 and 60, respectively. Those spikes create strong incentive effects to retire at those milestone ages, since retiring prior to those ages would involve forgoing the pension wealth accrual and retiring later would not lead to any further pension wealth accrual.

The evidence presented in this chapter suggests that those potential incentive effects of employer pension plans might indeed have the expected effects on both the planned age of retirement and the actual retirement decision. In essence, the spikes in the planned age of retirement and the actual retirement decision line up with the spikes in pension wealth accruals.

The statistical evidence strongly suggests that employer pension plans both facilitate and induce early retirement, respectively through the financial security they provide and the incentives they create. Nevertheless, this conclusion must be qualified: the evidence is indirect, since the available data do not enable us to directly incorporate the different features of employer pension plan into the cause-and-effect equations on the retirement decisions. Confirmation of this important conclusion must await data that enable directly incorporating the financial incentives of private and public pension plans into estimation equations for the retirement decisions of different categories of workers.

6. Other Issues Examined

Other issues peripheral to the main focus of the evaluation were also examined: issues of cross-subsidies across generations, gender, and income classes; implications for the neutrality of the public pension system on labour force participation and the traditional normal retirement age of 65; trends in pension plan utilization; potential substitutability of public pensions for what might become less generous private plans; the affordability of public plans; and implications for the EI program. This examination is not a complete assessment of any of these complex issues, but does provide some indications for further research.

6.1 Cross-Subsidies In Public-Private Pensions

The evaluation question examined in this section is: ***Are there cross-subsidies across generations, gender and income classes inherent in the system of public and private retirement pensions and its component parts?***

Intergenerational Cross-subsidies

In the private pension system, intergenerational cross-subsidies across different age groups are not likely to be substantial, in part because the cost consequences of such pension systems are anticipated and internalized by the parties. Since pensions are part of total compensation, intergenerational subsidies in the pension component are equivalent to intergenerational subsidies through the wage mechanism.

In private ***"defined-benefit" pension plans,*** *some intergenerational subsidies may exist*, but they are not likely to be substantial, especially when one considers pensions as part of total compensation. Changes can occur in such plans through any of their features including the benefit formula, the age of normal retirement, early and special retirement features,[80] and bridging supplements. Such changes obviously can have different effects on workers of different ages. Nevertheless, since pensions are part of total compensation, then it is reasonable to assume that the firm is agreeing to these changes as part of their optimal compensation decisions.

Generous early retirement packages, for example, may not be so much a transfer from younger workers to older workers, as they are an alternative to seniority-based wage increases or the continued payment of deferred compensation or more generous health benefits — all of which otherwise would have benefited older workers. If employers are "tilting" their compensation package in a specific direction (e.g., towards older workers) then presumably that serves other purposes,[81] just as say "tilting" it towards premium pay for certain skills serves the purpose of reducing skill shortages. It is true that different workers, including workers of different ages, may gain and lose from those changes. But these are not intergenerational subsidies in the sense of one generation subsidizing another.

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[80] Under early retirement, the reduction in annual benefits is less than the amount required to compensate for the fact that they are received earlier and for a longer period of time. Under special retirement, the subsidy is even larger since the recipient receives a full unreduced benefit.

[81] Allen and Clark (1987), Allen, Clark and McDermed (1993), Dorsey (1987, 1995), Huchens (1986), Ippolito (1985, 1987, 1991, 1994), and Lazear (1990).

Intertemporal-subsidies may exist for given workers over their lifetime with employers. For example, workers may receive deferred compensation whereby they are overpaid relative to their productivity when older, and underpaid relative to their productivity when younger. In fact, the typical "backloading" of pension wealth accruals can be regarded as a mechanism for such deferred compensation to occur. Such deferred compensation may serve other functions such as bonding with the firm, enhanced work effort, and reduced turnover, since the employee wants to remain with the firm to receive their deferred compensation. To the extent that subsidies are involved, they should be regarded as intertemporal subsidies for a given worker over their lifetime. They are not intergenerational subsidies across different workers of different ages.

It is tempting in this area to argue that some of the generous early retirement packages that are offered to older workers may represent subsidies from younger workers to older workers since younger workers obviously cannot currently take advantage of those plans. Presumably, this also means that there is less in the compensation package to distribute to younger workers if it is "eaten up" in the pension plan.

This can occur. But if it does, it should be regarded as part of any intergenerational subsidy that may exist because different dimensions of the compensation package including fringe benefits[82] may disproportionately affect workers of different ages. Generous early retirement may benefit older workers, although not those who "just missed" the changes. Dental plans may benefit younger workers with families, and one-time-only bonuses of a flat amount may disproportionately benefit younger workers at the low-end of the pay scale. Different elements of the compensation package obviously affect people differently.

Another reason it is unlikely that large intergenerational subsidies would be involved is that organizations have to balance the preferences of the different age groups in their work force. In fact, to the extent that most new recruiting is of younger workers, it is the preferences of those workers that may heavily influence the compensation package.

If older workers receive generous early retirement pensions, presumably the alternative would have been high seniority-based pay, neither of which can be currently accessed by younger workers. Furthermore, while younger workers may not directly benefit from the early retirement benefit, they may indirectly benefit by any increased promotion and job opportunities that may result.

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[82] Fringe benefits, or non-wage aspects of total compensation, include paid vacations and holidays, pensions, medical and health plans and employer contributions to such programs as Workers' Compensation, Unemployment Insurance and CPP/QPP.

In ***"defined-contribution"*** *private pension plans,* there is no apparent direct intergenerational subsidy since recipients essentially receive whatever the market earned on their contribution. There may be *ex post* windfall gains or losses, depending upon the market return on the pension fund, and those gains or losses may be distributed across different generations of workers. But there are generally no *ex ante* (before the fact) intergenerational subsidies.

In ***unionized environments,***[83] it is more likely that intergenerational subsidies could be more substantial and favour older workers. This is because union policies are often more heavily influenced by the median union voter who is likely to be older and interested in their pension plan features. Pension plans in the union sector tend to be defined (flat benefit) plans whereby the recipient receives a fixed monthly amount for each year of service (e.g., $40 per month times 35 years of service for a monthly pension of $1,400). Clearly, upward adjustments to that benefit formula, say to $45 per month, would disproportionately benefit older workers who have accumulated service credits. In fact, one of the reasons why flat-benefit plans as opposed to final-earnings plans predominate in the union sector is that any flat-benefit increase appears as a direct gain to the union in that round of bargaining, whereas in final-earnings plans the gain is more indirect through the wage increases upon which the wage formula (e.g., 2 percent of final earnings) is based.

Pesando, Gunderson and Shun (1992) document the extent to which enrichments to the flat benefit formula during rounds of bargaining disproportionately benefit older workers. The extent to which this should be regarded as an intergenerational subsidy from younger workers to older workers, however, is more open to question. Presumably it reflects the preferences of older workers who disproportionately influence unions. If those preferences did not get manifest in the form of pensions, presumably they would occur in other forms that would disproportionately benefit older union members such as seniority-based wage increases or job protection. Presumably, also, these are benefits that younger workers can also expect to receive as they move up within the ranks of the union work force. Intergenerational subsidies may be involved, but they are ones that younger generations of union workers can also expect to receive, and the younger workers may also be indirect beneficiaries of the promotion and job opportunities that may be opened up by early retirements.

In the ***public pension system,*** the situation is quite different because of the pay-as-you-go nature of the system. Public pension plans like the CPP/QPP (in fact, all of the elements of the public pension system, including OAS/GIS) are pay-as-you-go in the sense that the current generation of taxpayers pays for the benefits that are being received by the older generation that is now retired, in return for the expectation that their pension benefits will be paid by the upcoming younger generations.

Intergenerational transfers are an essential and unavoidable characteristic of "pay-as-you-go type" public pensions like CPP as originally conceived. They arose because early generations of CPP contributors paid a lower rate for shorter periods[84] to receive similar benefits. This effect of a rapidly introduced and primarily pay-go contribution scheme of the CPP was projected to continue beyond 2030 under the previous rules, but under the 1997 legislation contribution rate increases are slated to cease by 2003 when the rate reaches the "steady state" level of 9.9 percent. Having social safety net programs (OAS/GIS/SPA) and the compulsory and contributory CPP reduces the risk of personal hardship in old age. By doing so, these programs stimulate labour productivity, business activity and economic growth.[85]

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[83] Ghilarducci (1990), Leigh (1981), and Pesando, Gunderson and Shun (1992).

But recent amendments to the CPP[86] that accelerate contribution rate increases are intended to ensure the plan's financial sustainability, and make it fair and affordable for future generations of Canadians. These amendments, which are moving the CPP towards a more fully funded scheme, will improve the return on the CPP fund by investing it in a diversified portfolio of securities at arm's length from government. They will also slow the growth in costs by tightening the administration of certain benefits (e.g., disability) and the way in which these benefits are calculated.

Registered Retirement Savings Plans (RRSPs) *can also involve intergenerational transfers since they confer a tax advantage to current generations who utilize RRSPs.* As long as they are continued for future generations, however, then intergenerational transfers would not prevail. If they cease, or are reduced, then an intergenerational transfer would be involved, since the tax advantage is conferred on current but not future generations.

The rationale for RRSPs is in part to encourage savings for retirement so that retirees are not a burden on future generations. If that goal is accomplished, at least for those who take advantage of RRSPs, then it is not clear that an intergenerational transfer would be involved if they were reduced or cancelled. The tax advantage that is conferred may well be the correct "inter-temporal price" for the reduced burden that otherwise may be placed on future generations if they have to provide some measure of income security (GIS, SPA, provincial social assistance) for older generations.

Overall, the main intergenerational transfers are likely to be from younger workers to older workers through the pay-as-you-go CPP/QPP public pension schemes. But the extent to which this will put an additional burden on younger workers to finance their own retirement income, an expense that could be substantial given their own increasing life expectancy and hence expected time in retirement, is not currently known. It will depend on the return earned on the CPP/QPP and decisions around investments in private-pension vehicles and their returns. This financial burden may be further increased because younger workers also may be saddled with some of the expense associated with eldercare and medical care for their aging parents with increasing life expectancy. It is also the case, however, that the younger generation may find it easier to pay for these expenses, given their higher earnings from higher education that was perhaps partially financed by their parents.

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[84] This only applies to contributors who were age 18 before 1966. It is fully phased-in for contributors reaching age 65 after 2011.

[85] The justification for such transfers was addressed in the CPP Phase I Retirement Benefits. Evaluation Report, July 1995.

[86] See federal Budget Papers, February 24, 1998.

Cross-Subsidies by Income Class

The *cross-subsidies by income class are more obvious with respect to* ***RRSPs***, since higher-income persons tend to utilize them more and they benefit more given their higher marginal tax bracket. Conversely, low-income persons benefit less by the tax deductibility given their lower tax bracket. As well, they are often liquidity-constrained and in no position to forgo their current consumption to place savings in an RRSP. Low-income people also may have little incentive to save in RRSPs, to the extent that the future income from RRSPs would reduce any means-tested transfer payments they otherwise could receive from federal (OAS/GIS/SPA) or provincial (social assistance) sources.

With respect to private pension plans, there are unlikely to be substantial cross-subsidies by income classes. In ***defined-contribution plans***, recipients receive what their plan earns in the market. Large gains or losses may be inherent in such plans, since they depend upon market returns (such risk is the inherent concern with such plans); however, inherent subsidies by income class are not involved. However, RPPs (like RRSPs) are tax-sheltered investments implying interpersonal transfers to those who contribute to them.

The same applies to ***defined-benefit (final-earnings) plans***, since the benefits are simply a proportion of earnings. To the extent that persons with such plans are less likely to access means-tested public funds upon retirement, and tend to be higher-wage individuals, any subsidies are "progressive" in that such higher-wage persons are subsequently less likely to require public transfers (e.g., GIS) upon retirement.

As indicated earlier, ***flat-benefit plans*** that predominate in the union sector *can confer a cross-subsidy across income classes* because the flat benefit (e.g., $1,400 per month) is a larger relative proportion of earnings for a low-wage individual than for a high-wage individual in the same pension plan. Such a pension would replace 70 percent of the wages for a person who earned $2,000 per month compared with 56 percent for someone who earned $2,500 per month. Such a policy is consistent with the general tendency of unions to provide a more egalitarian wage structure, as occurs, for example, when they bargain for flat wage increases for their membership.

With respect to public pension plans, substantial cross-subsidies can exist by income classes even though the CPP/QPP benefits are based on earnings. Many of the features of public pension plans are designed specifically to be progressive, providing higher benefits to lower-income persons. The CPP/QPP, for example, has a cap at 25 percent of the average industrial wage. The universal Old Age Security (OAS) pension has a clawback rate of 15 percent for net income over approximately $52,000. The Spouse Allowance also has clawbacks, with the payment being completely clawed back for couples with income over approximately $21,000. The Guaranteed Income Supplement has a clawback of 50 percent for every dollar of income earned. Similar clawbacks exist in the provincial supplements such as GAINS/A in Ontario.

Cross-Subsidies by Gender

Private employer-sponsored pension plans can have a complicated set of potential cross-subsidies by gender. Obviously, "*defined-contribution" plans have no such cross-subsidies,* since the benefit is based on market returns on the contributions. However, "defined-benefit" plans *(either flat-benefit plans or earnings-based plans) can have such subsidies.*

Women may disproportionately benefit by such plans who have a similar work history to men since they have a longer remaining life expectancy than do men; hence, they can expect to receive pension benefits for a longer period of time. Furthermore, pension benefits are not allowed to be actuarially adjusted for such differences. But this is likely to be more than offset by a number of features of private pension plans, and they provide empirical evidence to that effect.

First, private pension plans often contain provisions for surviving spouse benefits, in which case at least some of the lower benefits to men are passed to their surviving spouse — which presumably the men value. This is enhanced by the fact that men tend to marry women who are younger than themselves, in which case the value of that benefit is even higher. Second and more important, especially because of childbearing and child-rearing, women are less likely than men to accumulate the service credits and seniority-based wage increases upon which pensions depend. The lack of service credits in the case of women may also make them ineligible for the generous early and special retirement features that can lead to large spikes in pension wealth accruals for certain older ages, as documented in Chapter 4.

Third, because of their generally lower wages, women are likely to receive smaller pension benefits from their own earnings. Fourth, women are simply less likely than men to be covered by an occupational pension plan. For these various reasons, women are likely to receive lower private pension benefits compared with men. The exact nature of any cross subsidy, however, cannot be easily documented, since that depends upon individual contributions which vary within age cohorts as well as pension receipts.

With respect to public pensions, similar complex differences prevail between men and women. Women are more likely to be employed in non-standard jobs (e.g., part-time, temporary or self-employed categories) which frequently do not offer pension coverage. Their generally lower earnings and work experience mean they would receive lower public pension benefits (e.g., CPP/QPP). Working in the other direction, women may receive the benefits longer because of their longer life expectancy. Furthermore, because of their lower income status, they are more likely to be eligible for the income-tested public programs (GIS, spousal allowance, and provincial social assistance). In this sense, GIS can be seen as a cross-subsidy to poorer members of society.

This later effect, however, should not be regarded as a cross-subsidy in favour of women. Rather, it is a result of their generally lower-earnings status making them more eligible for these kinds of income-tested transfers. Women who had the same earnings as men would not receive any additional public pension benefits simply by virtue of their gender, but would benefit longer from them because of their longer life expectancy.

Another evaluation question addressed was: *Are older workers now getting back what they put into the public/private retirement income system? Will they in the future?*

As indicated previously in the discussion of intergenerational transfers inherent in the public pension system, current pensioners, and to a lesser extent current older workers (above age 50) are generally getting a relatively high return from their C/QPP contributions when considered as an investment. This is especially the case for older workers who are now retired, but it is also true for workers who are approaching retirement ages. This occurs mainly as a result of the pay-as-you-go nature of the CPP/QPP and the CPP/QPP planned maturation process under which early beneficiaries with as little as 10 years of contributions following the introduction of these programs began receiving full benefits.[87]

Exhibit 6.1 summarizes the real internal rates of return (net of increases in consumer prices) for CPP contributors for selected generations. It compares the real internal rates of return before and after the recent amendments to the CPP[88] which will see contribution rates (employer and employee)[89] increase from 5.85 percent in 1997 to 9.9 percent in 2003.

EXHIBIT 6.1

CPP Real Internal Rates of Return, Selected Generations (Ages of Birth)

Birth Year	Past CPP Contribution Rate Schedule	Current CPP Contribution Rate Schedule
1911	22.5%	22.5
1929	10.2	10.1
1948	5.4	4.9
1968	2.9	2.5
1988	1.6	1.9
2012	1.5	1.8

See Office of Superintendent of Financial Institutions, Canada Pension Plan Sixteenth Actuarial Report, September 1997. This display is adapted from similar exhibits appearing on pages 14 and 101 of this report. These estimates are based on assumption of 1 percent real earnings growth per annum (an annual nominal earnings growth of 4.5 percent less annual inflation rate of 3.5 percent). These are before tax internal rate of return estimations.

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[87] See CPP Phase I Retirement Benefits Evaluation Report, Human Resources Development Canada, 1995, pp. 27-29.

[88] See Federal Budget papers, February 24, 1998.

[89] Such contribution rates are shared equally 50/50 percent between employers and employees.

Exhibit 6.1 illustrates the extent to which the amendments to the CPP contribution schedule will redistribute costs across present and future generations of contributors. For example, while the real internal rate of return (IRR) for the cohort born in 1988 would be increased 0.3 percentage points (from 1.6 percent to 1.9 percent), the IRR for the cohort born in 1948 would be reduced by 0.5 percentage points. All cohorts subsequent to the 1988 cohort will also experience increases in real IRR.

What older workers are also getting back from their investments in RPPs and RRSPs depends on the type of RPPs (especially the benefit formula) or the investment choices and returns with respect to RRSPs. It would also depend on their work/earnings patterns.

Whether older workers will get back in the future what they put into the private retirement income system (RPPs, RRSPs) will depend on the future health of financial markets when returns are linked to market returns, or what their plans will pay out in defined benefits. The same applies to the return on CPP contributions. Under the proposed changes to the CPP, the federal government is proposing to invest future CPP contributions in the stock market in a responsible way, while past contributions will continue to earn the long-term (20 year) interest rate on loans to the provinces. These returns will also be affected by inflationary factors. But it is noted in this context that people also often over-estimate the income required to live reasonably comfortably after retirement.

6.2 The Design of the Overall System

The evaluation question examined in this section is: *How actuarially neutral is the system of public and private pensions at different ages of retirement?*

The pension wealth accrual estimation results (Chapter 4) indicate the substantial transfers to early and special retirement that can be involved in private defined-benefit pension plans (RPPs) because the actuarial adjustments to private pension plans are insufficient to offset the fact that the pension is received earlier and for a longer period of time. The subsidies are particularly pronounced under special retirement benefits when there is no actuarial reduction and an unreduced pension is received at the age of 60.

Since 1987, CPP benefits have been payable at age 60 (QPP since 1984) on an actuarially reduced basis on the condition that the recipient has "substantially ceased working".[90] CPP benefits can be delayed until as late as age 70, in which case annual benefits are actuarially increased to compensate for the fact that they will be received later and for a shorter period of time. Other pension vehicles like RRSPs and defined-contribution pension plans have no actuarial implications since they are not normally founded on actuarial principles.[91]

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[90] In this case employment earnings must be less than the maximum CPP benefits payable at age 65. The adjustment in the pension based on years of entitlement is 0.5 percent per month upward between the 65th and 70th birthday or downward between the 60th and 65th birthday.

[91] These refer to procedures of actuarial science for analysing data and using assumptions to project future pension costs. For CPP these conform to the standards of the Canadian Institute of Actuaries.

Two other evaluation questions addressed were: *Is the coherence of the public/private retirement system consistent with a conventional retirement age of 65? Is the design of the public and private retirement system at cross-purposes with the need to encourage continuing labour force attachment by older workers below the age of 65?*[92]

The fact that pension wealth accruals are typically zero or negative at age 65 in private pension plans, and substantially negative in public plans at that age, suggests that the private and public pension systems might consider ways to facilitate rather than discourage continued employment at older ages, including beyond age 65. Nevertheless, there are strong forces at work to suggest that retiring at the age of 65 is no longer "normal".

Eligibility for an early retirement pension requires that individuals age 60 through 64 to wholly or substantially cease working at the time of the application. Recipients can obtain the early CPP retirement benefit and return to work. This requirement may potentially influence some individuals to retire sooner although existing research is inconclusive in this regard.[93]

As well the statistical analysis (Chapter 5) indicates that while age 65 is still the most common planned age of retirement, it is so only for a little over one-fifth of the work force. The vast majority are spread out over other ages, notably 60, 55 and even later than 65. The fact that considerable numbers report that they plan to retire later than 65, or they plan never to retire, highlights that the variation around the age of 65 is not all in the direction of earlier retirement. There is considerable heterogeneity in people's planned age of retirement, and public policy should take recognition of that diversity. The "one-size-fits-all" solution of retiring at age 65 certainly does not "fit all."

Perhaps of even greater policy significance, the analysis indicated that for younger persons, age 55 replaced age 65 as the most common planned age of retirement (Chapter 5). That ability may be challenged by various factors: the adequacy of their overall retirement income from all sources, the additional expenses some may incur from eldercare and medical care for their parents, and their own longer life expectancy and hence period of retirement. Managing those expectations may pose an important future policy challenge.

A future policy challenge may also arise to accommodate the desire for delayed retirement on the part of a substantial number of persons who want to continue working, perhaps on a part-time basis, in spite of the trend towards early retirement.[94] The desire for delayed retirement may reflect a variety of factors: longer life expectancy, improved health, restructuring away from physically demanding blue-collar jobs, increased non-standard employment that can accommodate transitions into retirement, problems of co-ordinating retirement among the growing number of two-earner families, impending labour shortages, and strains on the retirement income system when the baby-boomers retire.

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[92] These issues were extensively examined in recent studies: Monica Townson, "Non-Standard Work: The Implications for Pension Policy and Retirement Readiness", 1997; and William Mercer Limited, "Report on Phased-In Retirement: Pension Plan Issues", 1997.

[93] Baker, M. and Benjamin, D. (May 1998). ***Early Retirement Provisions and the Labour Force Behavior of Older Men: Evidence from Canada.*** Dept. of Economics, University of Toronto. Baker and Benjamin found that introduction of the CPP early retirement provision in 1987 led to an increase in pension receipt, but this had little effect on labour market behavior. It was found that among those who took advantage of the provision, most would have otherwise had limited involvement in the labour market. See also Leora Friedberg, ***The Labour Supply Effects of the Social Security Earnings Test*** (June 1998) University of California, San Diego, and NBER.

This desire for delayed retirement, or at least flexible retirement, may conflict with the incentives of the private and especially the public pension system that generally penalize continued employment. This is evident in the large negative pension wealth accruals documented in the simulations that illustrate the effect of penalizing delayed retirement. The clawbacks in the income-tested components (GIS, SPA) of the public pension system would particularly conflict with a desire to continue to work and earn labour market income.

Clearly, future policy challenges may arise to accommodate what will likely be increased diversity in desired retirement ages. While the trend is towards earlier retirement, significant numbers will also want to delay retirement, and may have to delay retirement for economic reasons. The requirement that CPP/QPP applicants have substantially ceased working and clawbacks on earned income arising out of other components of the public pension system (GIS, SPA), may be ill-suited to accommodate the legitimate desires of others to continue working. Clearly, greater flexibility may be needed in the public and private pension system to accommodate the greater diversity in retirement preferences and needs.

Other social purposes may be served by encouraging/facilitating earlier retirement rather than continued labour force participation. Earlier retirement may be a form of "intergenerational worksharing," opening up job and promotion opportunities for younger persons. As long as unemployment is high, especially youth unemployment, and as long as youths have inordinate difficulties making the transition from school to work, then early retirement would merit attention. Conversely, however, it is important to recognize that many people want to keep working, believing they still have something to contribute in the world of work or because they are attached to their jobs for non-economic reasons and find early retirement a difficult decision to make. As well, others may face liquidity constraints: the employee calculates that there will not be sufficient income for day-to-day living, so he/she continues to work in order to qualify for a higher pension, or the employee wants to be in position to help out other family members financially.

There may well be reasons why employers want to encourage continued labour force participation of older workers, just as there may be reasons why some employees may want to continue working, especially as a phase-in to retirement. Unless there are explicit social reasons for public policy to override these reasons, the decision to continue working should be facilitated.

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[94] Gunderson, Morley. "Flexible Retirement as an Alternative to 65 and Out," CD Howe Institute Commentary, No. 106, May 1998.

Pension experts[95] expect the demand for early retirement to continue in the immediate future, but to "bottom out" after the baby-boomers have retired. In a macroeconomic sense, early retirement has been positive. The problem is that the "best and brightest" leave early (those who suffer are the low-income workers who are ***forced*** to retire early). Unemployment rates are gradually dropping and Canada is moving towards a shortage of skilled workers (e.g., airline pilots, and teachers in Ontario in about five years).

Many workers will be needed in the next five to ten years to replace those who will have retired by then. It may well be time for governments to recognize the implications and start thinking about developing policies for ***later*** retirement.

The findings of this evaluation suggests *that the private and especially the public retirement income system may discourage continued labour force participation of older workers prior to the age of 65.* Equally important, they may strongly discourage continued participation after the age of 65. The simulation results have highlighted the declining and even negative pension wealth accruals that prevail as workers continue working up to the age of 65, and especially after that age. Many of these reflect the clawbacks from the income-tested components of the public pension system (GIS, SPA). As well, the criteria that the recipient must "substantially cease working" to be eligible for early retirement benefits under CPP/QPP is an obvious barrier to continued participation prior to the age of 65.

Obviously, these clawbacks and eligibility criteria in the income-tested components of the public pension system serve other legitimate social purposes, including the desire to minimize spillover benefits to higher-income groups so as to target such public-pension income support to lower-income seniors. Nevertheless, they can certainly discourage work incentives by offsetting the labour market income of recipients, especially low-income individuals who are most affected by the public-pension income-tested components. This suggests that policy requirements may need to address the important trade-offs that are involved in this area — an area of growing importance given the aging of the work force and the increased diversity in desired retirement ages.

6.3 Trends in Pension Participation and Other Issues

The evaluation question examined was: *Are there trends in registered pension plan design such as any move away from defined-benefit to defined-contribution schemes?*

Exhibit 6.2 illustrates recent trends in contributions, value of contributions and accumulated assets for the major categories of retirement income programs (CPP/QPP, RPPs and RRSPs).

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[95] Some specialists in pension issues whose opinions were sought on this matter included Robert Baldwin, Director, Social, Economic and Policy Department, Canadian Labour Congress, Ottawa; Professor Rob Brown, Statistics and Actuarial Science, University of Waterloo; Bernard Dussault, Chief Actuary, Office of the Superintendent of Financial Institutions, Ottawa; Malcolm Hamilton, William M. Mercer Limited, Toronto; and Professor Andrew Luchak, Faculty of Business Administration, Memorial University of Newfoundland.

EXHIBIT 6.2

Number of Contributors, Amount of Contributions and Accumulated Assets for Selected Retirement Income Programs, 1991,1995

Plan	Value of Contributors in millions		% Change	Accumulated Contributions (in billions of dollars)		% Change	Assets (in billions of dollars)		% Change
	1991	1995		1991	1995		1991	1995	
CPP/QPP	12.7	12.8	+0.05	12.0	12.8	+6.6	56.7	53.5	-5.8
RPPs	5.3	5.1	-3.1	17.1	19.7	+15.2	354.6	485.2	+36.8
RRSPs	4.7	5.7	+20.9	15.0	23.0	+53.0	129.3	200.4	+55.0

Source: Statistics Canada, "Pensions in Canada", January 1, 1996.

Exhibit 6.2 reveals a stabilization in contributors to CPP/QPP, an increase in the corresponding contributions (almost 7 percent), but a decrease in accumulated assets (almost 6 percent) between 1991 and 1995. While the value of contributions and accumulated assets for RPPs rose significantly, by about 15 percent and 37 percent respectively, the number of contributors declined slightly. The most dramatic increase in contributors (21 percent), value of contributions (53 percent), and accumulated assets (55 percent) occurred for RRSPs. But taxfilers age 25 to 64 cashed in just over one dollar for every five dollars contributed to RRSPs in 1995 (or $4.2 billion), which was largely in the form of cash withdrawals rather than annuity payments.[96]

Exhibit 6.3 displays the recent trends in the number of RPPs and memberships by type of RPP Plan.

EXHIBIT 6.3

Percentage of RPPs and Members by Type of RPP Plan as of January 1, 1990 and 1996

	Plans		Members	
Type	**1990**	**1996**	**1990**	**1996**
Defined Benefit	41.5	44.6	90.7	88.1
Defined Contribution	57.3	53.7	8.4	10.8
Composite	1.1	1.7	0.9	1.4

Source: Statistics Canada, "Pensions in Canada", January 1, 1996

Within the RPP category, it is noted that between January 1, 1990 and January 1, 1996, while the proportion of defined-benefit plans rose from almost 42 percent to 45 percent, the corresponding proportion of membership covered by such plans declined from approximately 91 percent to 88 percent. Defined-contribution plan membership increased marginally. It is impossible at this stage to determine if this suggests a developing trend.

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[96] See Statistics Canada, Retirement Savings through RPPs and RRSPs, 1991 to 1995, February 1997

Some specialists[97] in pension issues believe that current and potential regulatory constraints on defined-benefit pension plans (e.g., portability requirements, mandatory indexing, pro-rating for part-time employees, or the requirement that employers actuarially adjust pension benefits if the employee postpones retirement beyond normal retirement age) may shift people into defined-contribution plans. The extent to which this reflects a response to increased regulations placed on defined-benefit plans, as well as conflict over who "owns" the surplus assets in defined-benefit plans, remains an open question.

"Defined-contribution" plans may continue to grow in the future to the extent that future employment growth is in the small business sector, and such plans are more prominent in that sector in part because of their ease of administration. As well, recent stock market gains have enhanced the return on such plans, making them look attractive. Of course, this raises the issue of pressures on the public pension system if the "bubble should burst" and large losses in private pension wealth occur.

While it is true that employers are frustrated by this regulatory burden — and there is perceived to be an uneven playing field for the two types of plans — these constraints may not be seen as particularly influential by some. Defined-benefit plans may be perceived as superior because employees know what they will receive when they retire. And, although defined-contribution plans are less bothersome and more attractive to the employer, they do not have the same human-resource-management advantages such as potential work-incentives and resultant positive effects on productivity. However, *Statistics Canada reports suggest that the shift from defined-benefit plans is not significant: roughly 88 percent of employees are still covered by defined-benefit plans.*

Another evaluation question was: *What is the potential substitutability of public pensions for potentially what might become less generous private registered pension plans?*

As indicated previously, potential substitutability exists across all programs that serve an income maintenance purpose, and that substitutability suggests the need for policy co-ordination across the programs. *Nevertheless, there are obstacles that will make it difficult for the public pension system to pick up any "slack" that may result from a less generous private system.*

The public system (CPP/QPP, OAS/GIS/SPA) guarantees a floor level of protection. Recent CPP changes that will keep this overall level of support the same would not offset losses to those who were in private plans. Also there are trends towards higher medical and eldercare expenses associated with an aging population and longer life expectancies. While CPP contribution rates might be further increased, there would likely be increased resistance to higher payroll taxes and concern that they are disincentives to job creation if not passed on to wage earners. Younger generations would likely also be opposed to CPP rate increases. They might conclude that they would obtain an even lower return on their CPP contributions.

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[97] The same specialists were consulted on this issue as for the previous matter.

Managing those growing expectations for earlier retirement of the younger generation, when the financial pressures may not make it affordable, may be a policy challenge in the future.

A converse challenge may be to enhance the ability of the private pension system to absorb any slack that may result from a public pension system under increasing strain. Coverage under the private system is currently incomplete.[98] Furthermore, its ability to provide retirement income may be challenged by the changes that are occurring in the nature of work, and especially the growth of non-standard employment[99] although RRSPs remain available to workers.

In such circumstances, *with increased pressure on both the private and public pension systems to provide adequate retirement income for a growing retirement population, perhaps increased attention should be placed on a third alternative — removing the barriers that inhibit older people from continuing in gainful employment if they are able and willing to work, and for employees in non-standard work to obtain adequate private pension coverage.* The findings suggest that many of those barriers may be unintended by-products of the public and private pension system in general.

Even though the trend is towards earlier retirement, the statistical evidence suggests that substantial numbers want to continue working, perhaps to ease the transition into retirement. Removing institutional and regulatory barriers that inhibit their continued employment may well serve to reduce pressures on both the public and private pension system. Furthermore, they are likely to facilitate meeting the diversity in preferences for different retirement ages and forms of retirement that is likely to grow even more in the future.

The evaluation question addressed was: *What are the potential implications for EI take-up rates and the EI program generally, of the public and private financial incentives for retirement of older workers?*

The analysis does not highlight any obvious substantial implications for the EI system emanating from the financial incentives of the public and private retirement income system. It is true that persons who respond to the early retirement incentives of private pension plans may well return to the labour force and enter the state of unemployment as they engage in job search. Retiring from a particular employer and collecting employer-pension benefits does not necessarily mean retiring from the labour force. Persons who retire from a particular job but return to the labour force could return as unemployed or work for a while and then become unemployed. Furthermore, their unemployment could be prolonged if their age or dated skills makes it difficult for them to find jobs.[100]

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[98] At the beginning of 1996, 34 percent of the labour force and 42 percent of paid workers (i.e., excluding the self-employed in unincorporated businesses, unpaid family workers and the unemployed) were covered by RPPs in Canada. See Statistics Canada, Pensions Plans in Canada. No. 74-401XPB, January 1996.

[99] See Townson, Monica (1997). Non standard employees are those with part-time employment, who are multiple job holders and who are self-employed.

[100] See Davidson, Worrell and Fox (1996) and Hutchens (1988)

The analysis, however, suggests that this phenomenon is unlikely to be substantial. Retiring in response to the financial incentives of the retirement pension system generally means that the individual has the means to afford retirement. This is especially the case for high-wage persons. Low-wage persons may have a financial need to return to the labour force and look for continued employment, but they may have little financial incentive to do so given the large clawbacks of the public pension system they face if they earn additional income. It is true that some workers may want and need part-time and other work to phase into retirement. But these are not likely to be the kind of job seekers who would engage in prolonged job search while unemployed and collect Employment Insurance benefits. Older workers may also not have an incentive to engage in prolonged job search given the shorter period they will likely remain in the labour force and absorb the costs of such search.

It is the case that if the public and private pension systems are unable to deliver adequate retirement income, then individuals may be under economic pressure to try to access public income support systems. This could occur, for example, if private and public pensions became less generous or less available, in which case individuals may try to access other income support programs including EI, social assistance, CPP early retirement, CPP disability, other disability programs, and Workers' Compensation.

It is also the case that reduced generosity or eligibility for any of these programs can lead to a substitution into others. For example, recent restrictions on EI have led to a substitution into Workers' Compensation as a form of income support.[101] It is possible, therefore, that restrictions on EI could lead to individuals trying to access CPP early retirement or CPP disability. In that vein, public policy attention is merited with respect to the co-ordination of these and other programs that serve an income maintenance function.

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[101] Fortin, B. and P. Lanoie. "Substitution Between Unemployment Insurance and Workers' Compensation." *Journal of Public Economics.* 49 (1992) 287-312.

7. *Further Research and Data for Policy Guidance in this Area*

Another question which arises in the context of such a study is: *What further research and data compilation is necessary to provide policy guidance in this area?*

This question is a significant one indeed, considering the many data obstacles which were faced in addressing the key questions examined in this report. Our analysis, therefore, sheds light on a number of aspects of the need for further research and data compilation in this area. These include the following:

Further Data Development

There is a need to try to incorporate the different features of employer pension plans directly into the equations on the retirement decision. This requires a data set that provides information on the individual's type of private pension plan (e.g., defined-contribution, flat-benefit, final-earnings) as well as measures of the potential generosity of those plans, such as their benefit formula plus their early and special retirement features and bridging supplements.

Additionally, HRDC may find it useful to open additional liaison channels with Statistics Canada on how some of the key items of interest are measured and recorded in existing data sources. In planning for future research, for example, it would be desirable for the Survey of Labour and Income Dynamics (the successor to the Survey of Consumer Finances) to provide more details on income sources, for example breaking out RPP from RRSP data on incomes.

More broadly speaking, it would be interesting to examine the potential for a longitudinal component in some of the existing Statistics Canada surveys, to determine if more appropriate data on retirement decisions could be made available over the coming decades, when more and more concern will be focused on these issues.

The analysis highlighted a fairly substantial group of persons who seemed to want to postpone retirement, in spite of the more general trend (in recent years) towards earlier retirement. It would be informative to have information on the possible barriers that may exist that inhibit such persons from continuing on in employment if they so choose. This analysis has documented a number of those barriers, including the subsidies in the public and private pension schemes for early retirement and the penalties to delayed retirement, as well as the clawbacks that exist in many of the income-tested components of the public pension system. Other barriers could include the absence of protection against age discrimination (most human rights codes do not apply beyond the age of 65) and mandatory retirement policies.

Recognizing Diversity in Retirement Preferences

The analysis highlighted what is likely to be a growing diversity in the retirement preferences of individuals, with younger people planning to retire earlier, but substantial numbers of persons wanting to delay retirement and continue working. Further analysis is merited concerning the implications of these preferences. Can these expectations be met? Will they mesh with employer preferences and needs? What are their implications for the retirement income system and other elements of public policy? These appear to be important questions that can affect public confidence in the public pension plans. Evaluative and other research is needed to lay the groundwork for how best to go about removing the institutional and regulatory barriers that inhibit the continued employment of older workers.

Implications of Current and Recent Changes in the Workplace and Work force

Additional information is needed on the implications, for retirement decisions and for public and private pensions, of the dramatic changes that are occurring in the workplace and work force as the 1990s end. Such changes are emanating from various sources: on the demand side of the external labour market they emanate from such factors as globalization, trade liberalization, capital mobility, industrial restructuring from manufacturing to services, public sector restructuring, privatization and deregulation.

Changes in workplace practices and the internal labour markets of firms are giving rise to broader-based job classifications, multi-skilling, non-standard employment, contingent compensation, workplace teams, employee involvement, downsizing, mergers, joint ventures and alliances.

Supply-side pressures are emanating from an aging work force, the continued labour force participation of women, dominance of the two-earner family, life-long learning, and problems of assimilation of immigrants into the labour market.

Institutional changes are also occurring in the form of inter-jurisdictional competition in the regulatory and legislative arena for investment and jobs, budgetary deficits, and de-unionization in the U.S., which may spread to Canada. These inter-related changes will have profound implications for labour market and social policy in many areas, but especially with respect to pensions and retirement issues.

Other Types of Research

Ongoing research on retirement decisions may include large-scale concerns, such as those noted above, but smaller micro-studies may also be useful. One such type of research would be new micro-research into the way in which people think about the retirement decision. A number of such studies have been conducted (see literature review), but some areas have not been examined at any great depth from a Canadian perspective, such as the degree to which people actually are aware of the incentives in private and public plans and act on this information. It seems highly likely that individuals are quite variable in their ability to calculate such benefits, and that the presence or lack of this information and an understanding of these incentives is a key factor in retirement decisions that do not fit the models.

Evaluation Link-ups

Finally, the above types of data research activities would serve the ongoing evaluation needs of the department. This refers to the next evaluations of the Old Age Security and the Canada Pension Plan and/or of systems of federal programs (CPP/OAS) and tax-assisted private pension instruments (RPPs, RRSPs). This should include determining the impacts of various configurations of public and private pension plans on continuing employment at older ages for various classes of workers. It is also important to consider in advance what data developments might improve the sensitivity and utility of the results of the next evaluations.

End Notes

1* The household for which these estimations were calculated is a man born in 1930 who worked for 30 years at the median wage, and has a spouse born in 1933 who never worked earning 0.1, 1, 1.5 and 2 times the median wage ($37,022 in 1995). Some 24 private-public plan combinations were examined.

The variants of the private plans examined were as follows: ***first***, a "basic plan", under which the RPP defined-benefit retirement benefit formula, is 2 percent of final three-year average earnings for each year of service up to a maximum of 35 years of service; ***second***, a "subsidized early retirement" scheme under which the benefit is assumed to be available at the age of 55 and with at least 10 years of service. It is reduced by 5 percent per year for each year of age that early retirement precedes normal retirement at 65. This involves a subsidy because the benefit reduction is less than the actuarially fair reduction to reduce the annual benefit to actually compensate the beneficiary for receiving it sooner; ***third***, a "subsidized early and special retirement", feature which is the same as "subsidized early retirement" except that it is available at age 60 with 20 years of service. There is no reduction in annual benefit to compensate for earlier benefits which will be received for a longer period of time; and ***fourth***, the possibility of a C/QPP "bridging supplement occurring, in which case there is no offset or reduction in employer pensions associated with receipt of C/QPP. The offset would otherwise be 0.6 percent of earnings up to the Years Maximum Pensionable Earnings (YMPE), for CPP of $34,236 in 1995. This first becomes available at age 65. The supplement applies at the age of early retirement and is designed to bridge the gap in incomes that would occur if the person did not receive C/QPP until the age of 65. Two additional assumptions underlying these estimations are: (i) CPP and private pension contributions occur from age 30 onwards when the employee commenced working, and (ii) if the employee works beyond 65 there are no further pension wealth accruals, but there is a "fair" actuarial adjustment to exactly compensate for the fact that the pension is received later.

It is important to note that the simulations for the private RPP effects are built upon those for Gruber's public pension accrual estimates for the same worker who did not avail himself of the general "drop-out" privilege, for low earnings years or non-employed years in the calculation of CPP pension benefits. This is a maximum of 15 percent of working years between the ages of 18 and 65 (or ages 18 and 60 if an early CPP retirement benefit is payable) and after 1966 when CPP came into effect. This has the effect of creating a disincentive or implied tax on further work as early as age 55 for public pensions alone. Such workers only represent 10 to 16 percent of workers born in 1930 who would not have gained in terms of public pension wealth accrual at age 65 according to simulations carried out with the DYNACAN CPP Policy Model of Social Policy Branch, HRDC. Most male workers (between 84 and 90 percent) born in 1930 would have worked longer than age of 55, and some past the age of 60 to maximize public pension wealth at age 65. Calculations of public side pension wealth accruals with the drop-out likely would have moderately accentuated the spike effects of combined public and private pension wealth accruals to and somewhat beyond the age of 60. It should also be noted that workers born in 1930 (hence reaching age 65 in 1995) have all years prior to age 36 excluded from this CPP coverage, since the Plan did not commence until 1966. This factor affects the calculation of pension entitlements for all persons born prior to December 1947 to some degree because they would begin contributing to CPP some time after they would have joined the labour force.

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